# The Chemical Age

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# Notes and Comments

## The German Dye Trust

THE report of the German Dye Trust for the third quarter of its current financial year shows signs of an improvement in business in some of its branches. The declining tendency in many of the exports is said to have ceased at the close of the third quarter, and the beginning of a slight revival was discernible notwithstanding the many difficulties placed in the way of foreign trade. The company also reports a revival in its home trade, which is regarded as a symptom of gradual return of enterprise and confidence in a consistent economic policy. Sales of dyes declined during part of the summer, but showed some improvement in August and September. Business in nitrogen fertiliser has risen by about 10 per cent., as compared with the corresponding period of last year. The production of synthetic petrol at the Leuna Works was continued on the basis of 100,000 tons annually. In July all the respective American companies had become partners of the Hydro Patents Co., which was founded in 1930 by the Standard I.G. Co., for the purpose of utilising the distillation processes in the United States. Supplies of crude oil from Volkenroda remained considerably below expectations, but the company had adequate quantities of tar and other oil available. Business with a number of countries in pharmaceutical products and insecticides decreased in consequence of the growing restrictions in foreign trade. Home sales of photographic material improved during the summer as a result of the company's activities, but exports in this branch suffered considerably from foreign exchange restrictions, depreciation of currencies, and customs barriers. A certain revival was noticeable in rayon business, but this did not suffice to reach the figures of the third quarter of last year.

## Aircraft and the Chemical Industry

THOSE of us who went to hear Mr. H. T. Tizard deliver the first Hinchley Memorial Lecture before the Institution of Chemical Engineers, on Friday, October 28, were somewhat surprised at the wealth of information which he concealed behind the vague title of his lecture. At first sight, the aircraft industry seemed very remote from chemicals, chemical manufacture and chemical engineering, but we were soon convinced by the lecturer that development in aeronautics, have been of great value in promoting the uses of chemicals both old and new. The most striking example of this is to be found in the development of cellulose paints, for the possible uses of solutions of nitrocellulose and cellulose acetate had been explored only on a small scale before the world war. Used on a large scale for the protection of aeroplane and balloon fabric during the war, our scientific knowledge of cellulose esters accumulated rapidly, and the manufacture of cellulose acetate was commenced. This also promoted other developments. Shortage of the usual solvent, moreover, forced upon us the necessity to try substitutes, so enlarging our knowledge of cellulose solutions and preparing a way for the economic production of modern cellulose finishes. There are many other ways in which aircraft has influenced the chemical industry. The aircraft industry, it should be recalled, is not a self-supporting industry, and can only be made self-supporting by the intensive scientific investigation of all its problems. Such investigations lead into paths which would not be explored in the ordinary course of industrial research for the reason that "they would not pay." Things that "will not pay," however, often end by paying. For instance, the strong incentive to obtain the highest thermal efficiency in aircraft engines has led to the manufacture and use of lead tetra-ethyl on a large scale. There is now an equally strong incentive to develop heavy oil internal combustion engines for aircraft, and it is quite possible that this will only be satisfactorily accomplished if a suitable synthetic chemical can be found to promote the smooth combustion of oil when injected into the engine cylinder. Again, the economic success of air transport depends largely on the working life of an engine between overhauls, and this depends mainly on the stability of lubricating oil. Recent research on these problems has led to unsuspected results of special interest to chemists, and the study of lubricants is now becoming more and more a chemical problem.

## Cotton Research

IT has been stated that if the Lancashire cotton industry were to go right out of existence Manchester would still be a great commercial city, the centre of a great industrial area; but it would no longer be the Manchester that the world knows, the Manchester of which the world thinks when it speaks of "Manchester goods." The truth of this statement is to be found in the facts that about one-third of the world's machinery devoted to the production of cotton yarn and cloth is located within a radius of forty miles of the city and that even in recent years practically one-half of the international trade in cotton goods has originated in Manchester. Up to the outbreak of the war the volume of this trade was increasing year by year, and in 1913 the value of the exports amounted to nearly one-third of the total exports of all British manufactured goods. In view of these facts it is, perhaps, not surprising that the manufacturers pinned their faith on rule-of-thumb methods. Having built up a huge and pros-

perous industry by adhering to those time-honoured methods they were often unwilling to listen to suggestions the adoption of which would have necessitated some rearrangement of their operations. This conservative attitude certainly prevented them from perceiving the trend of events; but when, at last, it was realised that the conditions of world trade had definitely changed, that Manchester goods had to be sold in highly competitive markets, the methods of production and distribution were carefully reviewed. Hence the suggestion, put forward by the Department of Scientific and Industrial Research in 1916, that it might be desirable to encourage research in the cotton industry was well received. From this suggestion the establishment of the British Cotton Industry Research Association in 1919 and the foundation of its headquarters at the Shirley Institute can be traced. Throughout the past thirteen years this association has more than justified its existence, for during that period it has served, and well served, the interests of a highly complex industry. To-day 1,200 firms, representing about 85 per cent. of the trade, are members of the association, and their many and diverse problems, both fundamental and those arising from day to day in the factories, are being solved by a team of 200 workers under the direction of Dr. R. H. Pickard.

### Science and Practice

THIS is unquestionably one of the best examples afforded by this country of science and practice having met together in a fruitful embrace. That the carrying out of all this work necessitates a considerable expenditure of money is a trite thing to say, but, as R. L. Stevenson remarked, trite things are very often indefinitely comprehended; if this were not so, the note of warning to the industry, sounded at the recent annual meeting of the association, would surely have been unnecessary. The revenue account for the year showed an excess of expenditure over income of £5,600, this sum being almost exactly the amount by which the Government grant was decreased. Although most of the deficit represents depreciation of the Institute's property, the fact remains that there was a deficit on the year's working. Hence if the good work of the association is not to be curtailed, if fundamental research is to be carried out on a scale commensurate with the size and importance of the cotton industry, the funds must be augmented, and augmented quickly. As Dr. Pickard remarked at the meeting, the number of problems they are unable to tackle because of want of resources is getting large in number. The trade, he said, could quite usefully employ twice as many people as were employed at the present time on the investigation of scientific and technical problems to which the industry was now requiring an answer. Since the establishment of the association, two-fifths of its total income has been received from the industry, two-fifths from the Cotton Trade War Memorial Trustees, and one-fifth from Government sources. Last year the expenditure was £65,540, £24,580 of which was subscribed by members. In spite of the difficult times, it is incumbent on every member of the association to give unstinted financial support to the great work which is being accomplished, for on the prosecution of this work the future condition of the British cotton industry is largely dependent. In the words of Mr. H. P. Greg, the chairman, the industry must remember that some economics are unwise and unprofitable, and economy in research is one of these.

## A Further Lead from the North-East

ON October 15 we referred in congratulatory terms to the lead given by the Manchester chemical and allied organisations in establishing a Joint Advisory Committee for the co-ordination of the efforts of the individual societies and the compilation of a comprehensive programme of meetings for the present session. We are interested to learn from Mr. B. P. Hill, chairman of the Newcastle Chemical Industry Club, that the organisations in the North-East are working on similar lines. Last winter a calendar was produced entirely through the enterprise of the club, and it met with such appreciation that a representative committee of secretaries of interested societies was formed to ensure the future publication of such calendars. The programme for the 1932-1933 session has been issued, comprising some 160 meetings and representing no fewer than 34 technical and scientific societies.

We observe that the scheme covers considerably more ground than the chemical and engineering interests of Tyneside, and there would appear to be just a danger that it may defeat its own object by becoming unwieldy. It must be remembered, however, that pure and applied societies are freely interwoven in this industrial district and it is far from easy to fix the boundaries of such subjects. As a means of avoiding the overlapping of important meetings this scheme is worthy of the highest commendation.

### Decentralisation of Industry

IS the concentration in London of such a large proportion of the nation's trade economical, or would an examination of the claims of the out-ports prove to be profitable and enable a greater volume of business to be handled more expeditiously with less cost and with less expense to the ultimate consumer? This is the question raised by a courteous invitation which the Hull Development Committee has sent to the leading merchants whose businesses form a large part of the volume of the nation's turnover, to consider the possibility of economies being effected in the distribution of goods.

Firms whose business is favoured by the effect of the tariff policy are looking forward to an extension of trade and the Hull Committee suggests that its port, with its cheap methods of discharge, storage and distribution, offers unrivalled opportunities for the opening up of such ventures. In the case of firms whose business does not receive the benefit of the Empire preferences, it is becoming imperative that new channels of distribution be found and costs cut down to the minimum, and ports which can show savings and offer opportunities such as the Port of Hull (with its distributing area covering one third of the population of the United Kingdom) will certainly receive consideration when new plans are being formed. In ordering shipments to Hull it will generally be found that no extra freight is involved, most shipping companies offering the option of discharge at London or Hull, whilst the methods of dealing with cargoes enable considerable savings to be shown.

# Inventive Design in Chemical Engineering

By J. H. WEST, M.I.Chem.E.

CHEMISTS and engineers alike are occasionally confronted by problems in their work where apparatus or plant is wanted to perform some unusual operation, and none of the usual designs will quite meet the case. Alternatively, some well-known type of apparatus, while quite satisfactory under most conditions, gives trouble under certain special conditions, and another type is sought which will be free from this drawback. In this article an attempt is made to explain a systematic method of tackling such problems in the hope of helping those who are up against them and of encouraging others to study critically the plant and apparatus they use with a view to getting at the cause of weak points and failures, and thinking out better types and designs. The man who is daily operating or keeping in repair a plant may possibly have better opportunities for doing this than anyone else. Some types of chemical plant tend to become fixed or stereotyped over many years. They continue to be used for a given purpose just because that is the general practice, but real progress is made when someone, instead of accepting the standard type as necessarily the best, begins to criticise it, and find out just where it fails, and then proceeds to work out an improved design on radically new lines.

## Surveying the Real Requirements

The first and most difficult stage in tackling such a problem is to get a clear picture of what the real requirements are, both positive and negative, in order of relative importance. By positive requirements is meant the features that must be present, and by negative, those that must, as far as possible be absent. Let us take as an instance a heat exchanger, and put down some of the main points. Here we we want a large surface for heat transfer in a small bulk. We want the fluids on both sides of the separating walls broken up into thin layers or streams. We want easy paths of flow, without abrupt changes of direction, so that high velocities can be used without absorbing too much pressure, and we want efficient counter-current action so that the most can be made of the temperature difference available. We want accessibility for cleaning and ease of taking apart in case of repairs. On the negative side we want as few joints as possible, and what joints there have to be we want as easy to make and to keep tight as possible. We do not want a big external surface to radiate heat and require lagging, nor ports or passages which are difficult to clean, and we must avoid air pockets and dead spaces. Finally we do not want any design which is expensive to make, or unsuitable for the materials to be used in the construction.

Having settled our requirements as fully and as carefully as possible, the next stage is to consider the predominant ones from the angle of pure geometry, without regard to methods of construction or anything else. We must do our best at this stage to forget all about existing apparatus. We must start with our minds absolutely free from preconceived notions, and as if this was the first time that the problem had ever been tackled. Let us take another instance with some moving parts. Supposing we have a freezing operation, and we have to provide a large cooling surface on which a soft solid will freeze out of a liquid, and the solid has to be scraped off the surface as it forms.

## Geometricial Possibilities

In this case the reader will be left to formulate the requirements, and we will go straight on to the second stage. What are the geometrical possibilities? There is (1) a plane horizontal surface; (2) a plane sloping or vertical surface; (3) a cylindrical surface with vertical axis, using either the inside or the outside of the cylinder; (4) a similar surface with horizontal axis, either inside or outside; (5) any other surface of revolution; (6) a helical or screw-thread surface. We can further split up our plane surfaces into a number of smaller parallel surfaces, and our cylindrical surfaces into a number of concentric cylinders, and we can couple with each arrangement of surface a variety of notions of the scraper. For instance, with a vertical cylinder we can have a rotary scraper or an up-to-date one, and we can have fixed surfaces and moving scrapers, or vice versa. It would take too long in this article to set down all the possible combinations, but they should all be worked out, and we should not go to the next stage until we are satisfied that there are no more possible geometrical arrangements. We can then begin to sort out the possibilities and quickly discard those that are obviously unsuitable for one reason or another. For instance, a single horizontal surface would take up too much floor space, and would involve a very cumbersome scraping gear.

When we have weeded out the hopeless combinations we shall perhaps be left with half-a-dozen arrangements with possibilities from the practical point of view, and these should be worked up, and our power of visualising them developed by making freehand sketches of each in roughly practical form. Each design should then be examined to see how far it complies with the various requirements in order of importance. Several arrangements will probably have to be discarded at this stage, owing to the lack, or partial lack, of some essential feature, or, on the other hand, to the presence of one or more undesirable ones. We may then be left with two, or at most three, tentative designs to choose from. If there does not appear to be much in it between these, they should all be worked out in fairly full practical detail, and an estimate made of their comparative cost of construction, when the final selection can be made.

## The Keystone of Good Design

Remember that the keystone of good design is simplicity. Ask yourself at every point whether there is not a simpler way of arranging or making this or that detail. Be sure that nothing essential is left out, but be equally sure that nothing unessential is left in. There is something about a really good design that strikes one at once—a "cleanness" and an obvious suitability in every detail for the purpose in view, whereas a poor design will strike one as awkward and clumsy. In looking for new was of tackling old problems the use of analogy is sometimes very helpful. An excellent example of this is provided by the paraflow cooler or heat exchanger, in which the construction of a filter press is adapted to an entirely different purpose, and results in a really progressive step in heat transmission apparatus, for not only is the rate of heat transmission much higher than that obtainable with the usual tubular type, but troublesome expanded tube joints are avoiled, the apparatus is much more flexible in the duty it can be made to do, and, not least, it is considerably cheaper.

There is a big field to work on in these directions, and it is to be hoped that many of those who are in daily contact with chemical plant under working conditions will be encouraged to devote time to the thinking out of improvements, and thereby add to the interest of their work. They will, of course, meet with plenty of disappointments. Many an idea, which seems brilliant at first sight, will prove to contain some hidden snag when further investigated, but do not be deterred by this. Above all, do not expect to find the winning solution at the first attempt, or even in a short time. If ideas do not come, put the whole thing on one side for a week or two, and then come back to it fresh. It may be a year or two before the ideal solution, which you have been groping for, takes a clear form in your mind.

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## Natural Dyestuffs in the United States

ACCORDING to figures released by the Bureau of the Census, United States production of natural dyestuffs dropped in value from $2,425,084 in 1929 to $1,615,990 in 1931. Logwood extract, liquid and solid, continued to be the chief item of the domestic manufacture, with 17,031,755 pounds worth $1,250,594 in 1931 compared with 10,337,708 pounds worth $1,843,448 in 1929. Quercitron extract, liquid and solid, was produced to the extent of 1,437, 530 pounds ($63,156) in 1931 and 2,410,874 pounds ($171,702) in 1929. Other extracts were valued at $302,240 in 1931 and $410,834 in 1929.

# The Aircraft Industry and Chemical Engineering

## First Hinchley Memorial Lecture

THE first Hinchley Memorial Lecture was delivered at a meeting of the Institution of Chemical Engineers held at the Institution of Civil Engineers, London, on October 28. The lecturer was Mr. H. T. Tizard, Rector of the Imperial College of Science.

Lord LEVERHULME, president of the Institution of Chemical Engineers, recalled the decision to establish a series of Hinchley Memorial Lectures in memory of the late Professor J. W. Hinchley, the first hon. secretary and largely the founder of the Institution of Chemical Engineers and added that having regard to the fact that the late Professor Hinchley had been the first professor of chemical engineering at the Imperial College of Science—where he had trained as a student—and had taken such a close interest in the education of chemical engineers, it was felt that no more suitable and appropriate choice of the first lecturer could have been made than Mr. Tizard, the Rector of the Imperial College of Science. Having regard to the subject chosen for the lecture he also pointed out that Mr. Tizard had been closely connected with research in relation to aircraft and had also been secretary to the Department of Scientific and Industrial Research before accepting his present position.

### Cellulose Paints and Lacquers

Mr. TIZARD referred to a number of directions in which there is a close relationship between the aircraft industry and chemical engineering, and spoke first of its influence upon the development of cellulose paints and lacquers. Long before the war, cellulose and its solutions were used for the covering of balloon fabrics and probably the first real practical applications of solutions of nitro-cellulose was Andrée's balloon when he attempted to get to the North Pole in 1896. Later, when flying became practical, cellulose films and coverings of cellulose acetate and cellulose nitrate soon came into use for tightening the fabrics of wings. At the beginning of the war that became the standard method of dealing with fabric and during the war methods were developed of incorporating cellulose and pigments for "doping" wings by spraying methods. As, during the war, the supply of solvents got shorter there was an intensive research to obtain alternative synthetic materials and at the end of the war we had a process which had been practically completely worked out and a considerable knowledge of the properties of cellulose solutions in general had been accumulated. Other developments in connection with the motor car and in other trades were of the greatest importance to chemical engineers, but it was all due to the work originally carried out for the aircraft industry.

### Fuel Research

Another close relationship was in connection with the researches that had been carried out into the properties of fuel for aircraft engines. These had resulted in the knowledge that the application of lead tetra-ethyl to petrol considerably improved its properties as a fuel in the internal combustion engine by reason of its anti-detonating effect and the result of this had been the demand for the manufacture of lead tetra-ethyl on the scale of 9,000 tons per annum, which was quite a substantial chemical manufacture. This was used to dope about 2,000 million gallons of fuel and it was an astonishing reflection to think that this large quantity of lead was being dissipated into the atmosphere through internal combustion engines.

There were, however, other indirect connection between the aircraft industry and the chemical industry and an important one was the necessity, in aircraft, for getting rid of the heat of the engine which could not be used, as cheaply as possible. That was a matter which should appeal to the chemical industry because it involved the accurate measurement of the flow of gases, concerning which some researches had been carried out at the National Physical Laboratory. These related to the measurement of the rate of flow of gases at low speeds, 1 ft. or 2 ft. per second.

Another relationship was in the matter of the paying load of aircraft. According to Sir Eric Geddes the actual receipts from Imperial Airways were about half the cost of running the service, taking everything into account, so that there was considerable leeway to be made up before the service was on a paying basis. The weight of the engine and fuel necessary for an average flight was about the same as the paying load and as the power required to enable a machine to cruise at 100 miles per hour was proportional to the resistance of the machine through the air, the only reasonable means of increasing the paying load of the aeroplane per h.p. was to cut down the resistance of the machine, which would cut down the h.p. in the same proportion. It was thought to be quite possible to cut down the resistance of a modern aeroplane by something like 20 per cent. by further intensive research and that would increase the present paying load of 3½ lb. per h.p. to nearly 5 lb. per h.p. Before doing that, however, it was necessary to look into every detailed point of cost and it was here that some problems of interest to the chemical engineer emerged. For instance, the cost of fuel and oil was 16 per cent. of the total cost and that had forced a close examination of the use of light Diesel engines. One of the difficulties in that connection was to ensure an even combustion of the fuel. The problem was similar to that with the petrol engine and it was conceivably possible that it might be overcome by mechanical means. In the meantime, some experiments had been made in the Air Ministry laboratory on the possibility of getting over it partly by chemical means, just in the same way that the problem of detonation had been overcome in the petrol engine. For instance, the addition to the fuel oil of 2½ per cent. of an accelerator in the form of ethyl nitrate had an astonishing effect and there was here a connection, possibly, between the aircraft industry and the chemical industry. Again, there was the high cost involved in the stripping of aircraft engines after about 500 hours running, or about 50,000 miles, and this was rendered necessary by lubrication troubles, due to the gumming of the piston rings and carbonisation on the top of the cylinders.

### Improvements in Light Alloys

Finally, Mr. Tizard dealt with the question of light alloys for modern aircraft and the prevention of corrosion. About 60 per cent. of the modern machine might be alloy steel, about 18 per cent. might be duralumin, about 12 per cent. might be wood and the rest fabric, brass, copper and so on. The problem of saving weight in aircraft, therefore, was largely a metallurgical one and to find a substitute for the already light aluminium which entered into the construction so largely was a problem of great interest to chemists. Magnesium was about two-thirds the density of aluminium and therefore it was an obvious metal to investigate for aircraft purposes. Unfortunately, many of these lighter alloys were no stronger than aluminium, if as strong, weight for weight, and therefore could only be used in certain special parts, at the moment.

Lord LEVERHULME, proposing a vote of thanks to Mr. Tizard, said it had been made abundantly clear that notwithstanding the wonderful flights made by pilots our mastery of the air would not be possible unless there went on, side by side with these flights, patient scientific research work in the laboratory and workshop of which a glimpse had been given, work which involved mathematics, chemistry, physics, engineering and, last but not least, chemical engineering.

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### Belgian Nitrogen Producers

IT is reported that a co-operative association of the leading Belgian nitrogen producers has been formed under the name of the Federation Belge des Producteurs d'Azote, to arrive at gradual technical unity between the various Belgian nitrogen producers. The names of the participants are Société Belge de l'Azote, Carbo Chimique, Produits Chimiques de la Meuse, Produits Chimiques du Marly, Union Chimique Belge, and the Comptoir Belge des Engrais Azotes.

# Letters to the Editor

The Editor welcomes expression of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

## Group Selling in the Empire

SIR,—On reading the editorial on group selling in the Empire in your last issue, my first involuntary comment was "heaven protect us from the statistician!" The membership of this association *per se* is admittedly "only 109," but by member is meant a firm, corporation or company. This is quite a different thing from an establishment as the student of chemical statistics ought to have known if he had read carefully and intelligently the Census of Production reports from which he quotes. A large number of the A.B.C.M. members have more than one establishment or works, in fact some of them, such as Imperial Chemical Industries, Ltd., and Lever Brothers, Ltd., have a great many.

As regards the figures relating to allied businesses, I do not know what authority your statistician has for including the types of firms for which he gives figures. There are a variety of interpretations given to the expression "the chemical and allied industries" or "the chemical group of industries": there are at least three different definitions in use in British Government circles; none of these accord with the statistician's apparent definition or with the interpretation which the A.B.C.M. has in practice given to the words "the chemical and *closely* allied industries" which appear in its articles of association. As regards the list you quote, glass; oil and tallow; cement; starch and polishes; ink, gum and sealing wax; sugar and glucose are generally not regarded as falling within the ambit of the A.B.C.M. and most of these sections of industry have trade organisations of their own.

In considering the extent to which the A.B.C.M. represents the chemical and closely allied industries, it is necessary to take into account the firms which belong to the organisations affiliated to the A.B.C.M. These organisations, such as the British Disinfectant Manufacturers' Association, the Association of Tar Distillers, the National Sulphuric Acid Association, etc., while constituted to handle certain problems peculiar to their special sections of the industry, work in conjunction with the A.B.C.M. where matters of broad policy or which affect the chemical industry as a whole have to be considered, such as for example in the case of the Import Duties Act and the Imperial Conference at Ottawa. If the non-A.B.C.M. firms in these affiliated organisations are taken into account, as they must be, the membership represented is then not 109 but 470. Even this latter figure does not convey the full significance of the representation, since in the case of a number of associated or closely allied companies, working to a common policy, membership of the association is generally restricted to only one of them. It is unfortunately not possible to correlate the membership figure with the number of establishments given in the Census of Production reports. Thus in considering the scope of the A.B.C.M. a much better basis is the capital which it represents. A close estimate indicates that this capital is of the order of £200,000,000. While it is not possible from any published data to estimate the total capital of all the firms in the chemical and closely allied field in this country, it is highly improbable that the amount outside the A.B.C.M. is more than 10 per cent. of the above; thus the A.B.C.M. may be regarded on the basis of capital—which will have a close relationship to value of production—as representing something of the order of 90 per cent. of the industry for which it stands.

It is regretted that, as in the case of every other trade association, there are, for various reasons, which I need not detail, a number of manufacturing firms outside the A.B.C.M. which we would be glad to have inside it. In making an arithmetical comparison of the members inside and outside the association it would obviously be absurd to adopt a basis of counting heads, because on such a basis a firm of only £10,000 capital would count the same as a firm like Lever Brothers, with a capital of well over £50,000,000. In the absence of data to indicate the value of each firm's production, the most satisfactory method of comparison is certainly capital; on this basis it can be confidently said that there are only a few firms of importance outside the organisation, the rest being very small indeed, and they do not affect the representative nature of the association which for years has been accepted by the Government as the mouth-piece of the British chemical industry.—Yours faithfully,

J. DAVIDSON PRATT.
General Manager, Association of British Chemical Manufacturers.

166 Piccadilly,
London, W.1.

SIR,—I suppose the writer of the article on page 400 of THE CHEMICAL AGE, of October 29, under the heading "Group Selling in the Empire" does know what he is talking about.

I have carefully examined the figures of the membership of the Association of British Chemical Manufacturers and disagree very considerably with the statement made in your article. For instance, the affiliated societies, such as mine and the Disinfectant Manufacturers' Association, contain within their membership almost the whole of the entire trades concerned.—Yours faithfully,

ARTHUR MORTIMER.
Secretary, Wholesale Drug Trade Association.

45 Gordon Square,
London, W.C.1.

### Poppy Day

SIR,—As the National Organiser of Poppy Day, I wish to refute an untruthful rumour to the effect that owing to a fire and the consequent loss of stock last May, at the British Legion Poppy warehouse, some of the emblems which are to be issued for November 11 have been made by female labour outside the factory. This rumour, if not immediately contradicted may cause disappointment to the public which attaches considerable importance to the fact that the poppies are made by the labours of disabled ex-Service men.

Immediately after the fire occurred, the British Legion poppy factory staff was augmented by a further 90 disabled men, making a total of 350 men, who have been working extra time to make up the deficit. It was realised at the outset that there might be a slight shortage of the higher priced poppies, but it was thought better to risk his, rather than have a portion of the necessary stock made elsewhere, trusting that the shortage would be overcome by the sympathetic co-operation of the public, in giving with their customary generosity, without regard to the particular kind of poppy they might be asked to accept in exchange for their contributions.—Yours faithfully,

W. G. WILLCOX.
Organising Secretary,
Appeals Department, British Legion.

18 South Street, Park Lane, W.1.

### Chemists and Controversy

SIR,—The article appearing under the caption of "The Institutes of Chemistry" will cause many of our younger chemists to pause before joining one or more of those societies which exist, or should exist, for furthering the advance of chemistry. There are many of such chemists, and of other chemists like myself who have sampled these societies, who have the greatest admiration for Professor H. E. Armstrong, not merely because he is the doyen of the present age in chemistry, but also since he is the only stalwart with a wide experience of the tendencies of chemical societies who dares to speak out.

The columns of a journal like THE CHEMICAL AGE, being independent and therefore free from bias and prejudice, should form an arena in which the rival factions could give their views. Meetings in London followed by the usual discussions are of no avail to the large number of chemists scattered throughout our country; but the appearance in black and white of all the pros and cons of such topics would clarify this situation in which the younger chemists find themselves.

There are certain " pure chemists " who hesitate to air their views in the columns of a journal of applied chemistry. But why? We have no journal of pure chemistry—that is, if we take the word " journal " to signify something more than a compendium of research papers hardly intelligible to the everyday chemist. THE CHEMICAL AGE, however, does penetrate into the wilds.

We chemists seem to abhor controversial contributions to journals. Those of us who read widely and attempt to assume the wider designation of " scientist " rather than the narrower label of " chemist " follow with delight the exhilarating controversies which arise from time to time in the biological world. We have experienced a recent example in the rival views of Professors MacBride and Haldane concerning the hereditary transmission of acquired characteristics. First " The Observer " and then " Nature " furnished the arena in which these experts interested even non-biologists in their interpretations of Lamarck and Metalnikoff. Such controversies stimulated our minds; indeed, some of us were hoping it possible for an eminent biologist to solve our own problem as to what constitutes a true-bred chemist, and what characteristics we chemists are likely to pass on to the new generation. We might have been told, for example, that the curious flattening of thumbs and first fingers in our children is due to a constant gripping of test tubes by the parent.

If we cannot arouse slumbering chemists by any such startling suggestion, we ought at least to hear the opposing views on topics which are more within our own domain. Has our science become so vast that each one of us tends to concentrate along one little route without worrying whither the other fellow is going? Controversy and criticism are stimulating; they are evidence that science is fully alive, not merely in practical applications (where the evidence for chemistry is devastating in quantity), but in theoretical aspects. At present we seem to be lacking as regards critics and champions of controversy. Our sole star performer who combines humour with erudition is the resolute " H.E.A.," whose acid tongue and whip with many strands are known to us all. Each week that passes we hope to be entertained further by his attacks on chemical education, on chemical societies, or other of his favourite themes. But where are our other stars comparable to those of the biologists?—Yours faithfully,

" PRO BONO CHIMISTAE."

# Duties on Imported Machinery

## A Hard Case Under the Import Duties Act

A MEMBER of a large chemical engineering firm in London sends us the following history of an unsuccessful application for exemption from the whole or part of the duties chargeable under the Import Duties Act on a consignment of imported machinery of a type not for the time being procurable in the United Kingdom.

CHEMICAL manufacturers received with considerable satisfaction the announcement early in July last that the Import Duties Advisory Committee was open to receive applications in connection with the scheme authorised by Section 10 of the Finance Act, 1932, for the exemption of particular consignments of machinery, being machinery of a kind not for the time being procurable in the United Kingdom, from the whole or part of the duties chargeable under the Import Duties Act, 1932. The announcement was clearly a recognition of the fact that British chemical and other producing manufacturers were still dependent to a certain extent upon the enterprise of the foreign plant producers, and while the Import Duties Act as a whole was designed to protect and encourage the home production of plant, the opportunity still to import machinery not obtainable in the country was fully appreciated. The experience of one company in its first application for exemption from duty, however, has convinced the writer that whatever favourable influences were at work in the designing of the Act have ceased to operate since it was brought into practice.

Section 10 of the Finance Act provides that if the Import Duties Advisory Committee is of the opinion that, having regard to all the circumstances, it is expedient that certain machinery not obtainable in this country was fully appreciated. of any or all of the duties chargeable under the Import Duties Act, it may make a recommendation to the Treasury accordingly, and the Treasury, after consultation with the Board of Trade, may by licence authorise the importation of the consignment in accordance with the recommendation.

### Plant of Special Construction

Due application was made under the Section in respect of the importation of a steam-heated still of special construction to permit of accurate temperature control, for use in connection with the manufacture of artificial resin. It was explained in the application that the particular type of still, with heating coils tested to a very high pressure cast inside the walls of the vessel, was not made in the United Kingdom. It was further stated that the only other type of vessel, *i.e.*, ordinary steam-heated stills, did not permit of a sufficiently accurate temperature control, and therefore resulted in loss of product.

Following certain minor formalities, the applicants were informed that " machinery of a similar type " to the still and condenser which they wished to import was procurable from a certain firm whose name and address were supplied. The committee's letter added: " Before the committee give further consideration to your application, they direct me to invite your observations on this alternative source of supply." To this the applicants replied that so far as they were aware, the firm named by the committee did not supply the particular type of vessel required. The nearest type was a vessel with coils for oil circulation, which was not sufficiently accurate and easy to control, and therefore resulted in inferior products and loss in output. However, they took up the matter again with the firm and eventually forwarded to the committee the firm's reply, stating quite candidly that they did not make the particular system of steam heating required.

The applicants verbally discussed with the firm the alternative systems which the firm suggested, pointing out that neither of them would permit of the required degree of accuracy in temperature and also the cooling mediums alternately. Moreover the oil system required a fairly costly heating installation and it would be unreasonable to expect a manufacturing concern with steam available to put down a separate unit for oil heating.

### Question of Alternative Supply

Nearly two months after the application had been lodged, the Import Duties Advisory Committee formally notified the applicants that it was unable to recommend the issue of the required licence. As the applicants were under the impression that the provision of Section 10 had been complied with in every respect, and seeing that they had gone to a great deal of trouble to ascertain that the particular kind of machinery was not procurable in the United Kingdom, they inquired, for future guidance, on what grounds their application had failed, or whether it would be possible to have at least a reduced duty licence.

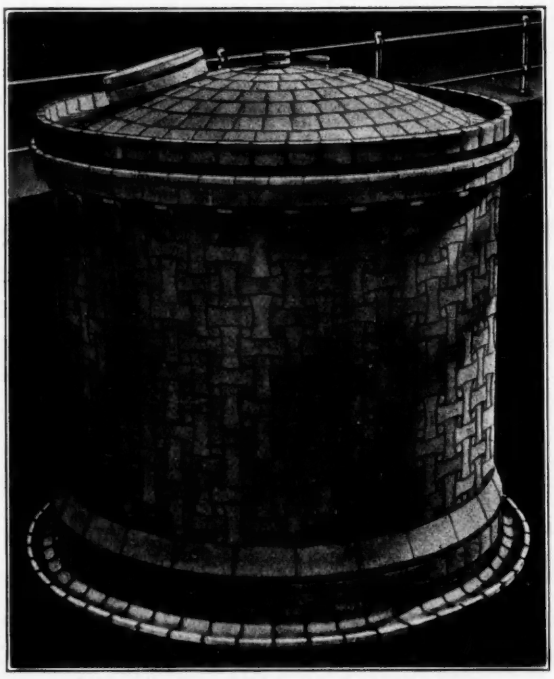
All that the committee could say in reply was that it was " satisfied in this case that an efficient alternative plant is available from a British source of supply " and it was unable to see its way to altering the decision previously given. Not content to leave the matter there, the applicants pointed out that " the one source of supply put forward by you was investigated by us, and we sent you their reply definitely stating that they were not making the type of still we required. If the committee has any other sources of supply, we should be very pleased indeed to investigate same and should, therefore, be glad to have their respective addresses." The correspondence closed with a brief reply from the committee regretting that " in the circumstances already explained," it must adhere to its decision.

# A Useful Range of Acid-Resisting Materials

## Combating the Destructive Action of Chemicals and Chemical Vapours

PRIOR to the world war there was only a limited demand for acid-resisting products as lead and acid-resisting steels were mainly in use. It was the difficulty of obtaining metals on the Continent during the war period that led to research for an efficient substitute. Great attention was devoted to materials having a ceramic base, which as substitutes were at first not very successful. Acid-resisting blocks were made to groove into each other, and the joints were made with sodium silicate mortar; others tried making the points between the blocks with asphalt, as well as constructing the whole container of asphalt, but acid penetrated through the joints in a comparatively short time. Two, three, and even four layers of blocks with breaking points were tried, but without success. The asphalt which was used was far from being satisfactory as an acid resisting agent, especially when the acids were hot and highly concentrated, when the asphalt quickly became porous and spongy and lost all protective value.

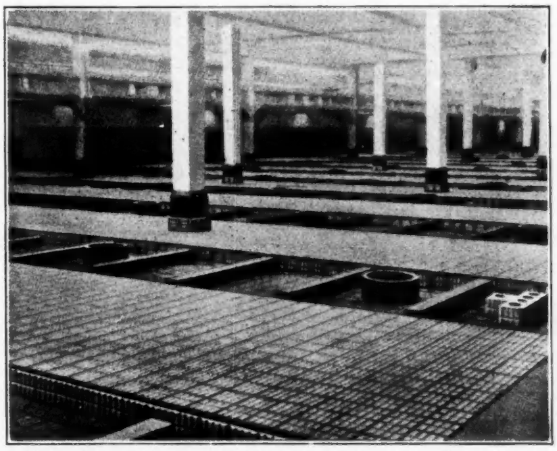
Firms engaged in the manufacture of acid-resisting products appreciated these defects and carried out an extensive series of trials with a view to finding materials to overcome the foregoing disadvantages. The principal object was to obtain elastic, flexible, high-temperature resisting and acid-proof materials which would take up expansion and contraction without rupturing, and to produce comparatively



Nitric Acid Storage Tank in "Zeta" patent bonding.

thin layers which were equally or more effective and cheaper than the acid-resisting metals previously employed. These investigations met with considerable success.

In these days practically all industries employ acids or alkalies in one form or another, but those which do not make direct use of corrosive liquids are often troubled with attack by acid fumes, either from the atmosphere or from neighbouring chimneys and plants. This problem has become so generally recognised in recent years that efforts have been made to combat it (particularly in connection with plant as distinct from buildings) by the use of constructional materials which are not readily affected by corrosive liquids and vapours. Whilst in many cases these measures have been satisfactory and permanent, in others they have not been entirely so, and more important still the expectation of life has not justified the initial expense. On the Continent of Europe and in America the problems presented by acid and other forms of corrosion not only received consideration but have been dealt with satisfactorily and economically for many years. The result is that Continental manufacturers have to a great extent overcome their troubles and been enabled to reduce their maintenance and working costs.



KaBe flooring laid in an artificial silk spinning shed. These floors resist the highest concentrations of acids and alkalies, hot or cold and are definitely liquid proof.

Many, if not most of the important chemical, artificial silk, glass, sugar, dairy and food factories on the Continent have adopted products manufactured by the "KaBe" processes, and these over a period of years have proved lasting and permanent. These "KaBe" products are now available in this country through H. Windsor and Co., Ltd. They comprise a very extensive range, varying from paints to special types of tiles, and varying in colour from dead black to white. One or other of these products can be successfully applied to prevent corrosion by oil, water, or other acids or alkalies, of any concentration, either hot or cold. Acid containers, storage tanks, floors or vessels containing liquids of any type can be lined with these materials. Chimneys, Gay Lussac, and alkali towers and flues, etc., can be entirely constructed of such materials, and by a special patented method of construction they are claimed to be capable of being erected in a manner which gives superior strength and stability as compared with ordinary brick or steel and concrete structure. At the same time such a form of construction is much lighter in weight.

A lining for a tank which has to deal with the pickling of heavy steel castings may be constructed of four or five different layers of "KaBe" products, whereas a similar lining for light article need only have two layers. Tanks for hot hydrofluoric acid can in many cases be treated with one layer, but under certain circumstances two or three are advisable. Many of these "KaBe" products are unique in their properties. Among the products available are tiles which have a compressive strength of 16 tons per sq. inch, paints which are resistant to all acids (including hydrofluoric), alkalies or salts whilst being good heat and electrical insulators, and flooring compounds which will resist all liquids and at the same time take up expansion and contraction. The special technical staff employed by H. Windsor and Co., Ltd., are in a position to construct acid resisting linings and all kinds of containers, towers, conduits, floors, gas washing plant, channels, sewage plant, chimneys, etc., as used in various chemical, metallurgical, artificial silk, textile, and galvanizing industries, by-product works, etc. They are constantly working out improvements based on the data they are receiving from the chemical using industries in order to keep methods and products up-to-date.

# World Problems of the Chemical Industry

## Prospects for Young Chemists

ADDRESSING the students of the Imperial College of Science, London, on October 27, on "World Problems of the Chemical Industry" Dr. Herbert Levinstein expressed the view that in spite of the present trade depression and unemployment, the world has not nearly reached saturation point for commodities. That was important to the coming generation of physicists, chemists and engineers whose business it was to invent new products or to make easier the manufacture of old. He did not share the view that we have been so successful in invention and in mass production that we must call a halt or that unemployment as we now know it would be permanently with us. If we could but free our minds from the difficulties of the moment, and survive them, we should experience a period of great industrial activity.

Reviewing the prospects for young chemists and for research in industries which at present were of chief interest in chemical industry, he dealt first with the dyestuffs industry. Some people, he said, might think that owing to the immense amount of organised research devoted to the dyestuffs industry during the last 60 years, no useful dyes remained to be discovered. Nothing could be farther from the truth. The truth was that never in the modern world did there appear to be the same opportunities for young men as there used to be. The development of the dyestuffs industry in Germany was chiefly due to their capable sales organisation which enabled them to sell in large quantities and at high prices any new useful dyes. The dyestuffs industry had two great objects in research. The obvious one was to replace natural products, such as indigo and madder, by synthetic products equal or better in quality, and cheaper in price. For these, the market was already made. The other was the discovery of new products for which a demand had to be created and for which judgment in the selection of results was at least as important as the experimental work itself.

### Fine Chemical Research

The fine chemical industry offered a career of great charm to an organic chemist whether his bent be pure or applied research or manufacturing. Among its problems were the most important that confront the human race. The discovery of vitamins and of hormones, and the synthesis of some of these, were signs of hope to suffering humanity. The administration of insulin obtained outside the human body, for instance, had been a wonderful benefit. The next part of the problem still required solution, *viz.*, the discovery of how to regulate the production of insulin by the cells that control it in the body.

In the same way, there was an enormous scope for ability and research in the application of chemistry to agriculture. Insecticides, fertilisers, fungicides, the cleaning of land by chemical means, and problems of ensilage were all matters for the chemical industry. It was strange how the food industry now prided itself on strict chemical control whereas a few years ago nothing could have been more damaging to a foodstuff than to associate it with the word "chemistry." One of the most encouraging features of the last few years had been the work done largely at Cambridge on the preservation of food—the use of ethylene for ripening fruit and the many uses of carbonic acid, both in the solid and the liquid state.

### The Economic Position

Speaking of the general economic position, Dr. Levinstein expressed the view that post-war finance has been influenced far too much by bankers and political economists, as well as by decisions made inevitable by politics. While the world had greatly advanced in the art of making commodities and in transporting them, it seemed to have remained backward in arranging for their international exchange. Skilful propaganda, combined with, perhaps, the hire-purchase system, the most powerful sales factor of modern times, could commence to push our goods where they were now excluded. The removal of the currency difficulties was one of the burning political questions of the day to be settled by international agreement. Unfortunately, the decisions taken at international conferences were not necessarily those that wise men knew to be right but those that wise men held to be politically expedient. The fundamental cause of the collapse in trade and of currencies was a sudden shortage of gold where previously it had been in supply, and this had been due to the agreements made after the war to ship an agreed weight of gold to the United States. Instead of taking that gold out of stock, however, it should have been provided by increased production but the sending of this gold out of our stock was the first and crucial step in breaking prices and the disasters that had followed.

The fall in our currency was now stimulated by the production of gold and, simultaneously, it was possible to see the dawn of a revival in the price of commodities.

# A Scientific Basis for Glass Manipulation

## Professor Turner's Lecture to the Society of Glass Technology

THE first meeting of the Society of Glass Technology for the session 1932-33 was held in Sheffield on October 19, the president, Mr. Edward Meigh, in the chair.

In the course of a brief introductory address, Mr. Meigh outlined the outstanding features of the programme proposed for the session and appealed for the united help and support of all members. He spoke of membership, its benefits, and demands, from the points of view of individuals, and then of the society as a whole. He said it was of great benefit to a scientific worker to be able to speak about his various investigations before his fellow workers and to have their criticisms and comments. Although much useful work was done by the hermit type, one could not fail to be helped and to develop new ideas if one were able to discuss freely theories and practical results with others engaged on similar work, and yet again with those engaged in the practical side of the industry. Thus, on the eve of a new session they came, not grasping for crumbs from others, but hoping to obtain opportunities of self expression so that the value of their future activities might be enhanced.

Turning to the consideration of membership from the point of view of a society as a whole, Mr. Meigh referred to the great difficulties encountered in the past year by the whole of the industry. Difficulties, however, gave rise to proportionate opportunity. In the past the society had not followed a stereotyped programme, nor stuck to any particular routine. New outlets and new problems had been found, and the next session would be no exception. Looking back upon various problems it was evident that the more that was done and solved, the more there was to do.

### Physical Factors and the Manipulation of Glass

A lecture entitled "The Scientific Basis of Glass Manipulation with special reference to Automatic Glass-Forming Machines," was given by Professor W. E. S. Turner, D.Sc., as part of the proceedings of the evening. At the outset Professor Turner explained that the fundamental factor in all working of glass was the property whereby, although a liquid at high temperatures, it did not suddenly solidify like a metal, but slowly passed through a plastic to a rigid state. With the help of lantern slides he illustrated three methods for the conversion of molten glass into sheet for window glass. Into all these the factors of time and temperature entered. In all it was essential to develop an outer layer of sufficient rigidity to prevent deformation, but in some processes of glass making there were discontinuities in the manipulation, due to the need, at some stage, of re-softening this outer layer. The Fourcault process, for instance, was an excep-

tion. Four physical factors governed the manipulation of glass, namely (1) viscosity; (2) rate of change of viscosity with temperature; (3) tendency to devitrification; and (4) rate of loss of heat by conduction and radiation. Since manufacturers took care to avoid compositions of glass likely to devitrify when working, that factor was not considered further.

Considering viscosity, values obtained for glasses similar in composition to ordinary bottles were given (along with others for glasses richer in alumina) between the temperatures 800° to 1,300° C. As would be remembered, the limits of viscosity for glass in working, as agreed with the German Society of Glass Technology, were $10^3$ and $10^6$ poises, but it was possible that these limits would vary for different processes. From the values given, it was evident that, if the setting rates were reasonable, the alumina-containing glasses could be worked as well as the ordinary lime glasses, provided that the glass was discharged from the furnace at a suitable viscosity. A higher temperature was necessary all through the working range, and better technique was called for, but the glasses were not unworkable. Based on conductivity values at ordinary temperature, losses by conduction from the common machine-operated glasses were much the same, being governed largely by silica content. Numerous data were given of the initial working temperatures of lime-soda-silica glasses used for making plate, sheet, and bottles, both hand-made and machine-made. The loss of strength of bottles due to lack of homogeneity was stressed, and interesting illustrations were given of the formation of cords and striae in bottles made on suction or gravity fed machines, due to chilling in the mould. The effect of surface tension, of which, for glass, little was known, was also discussed.

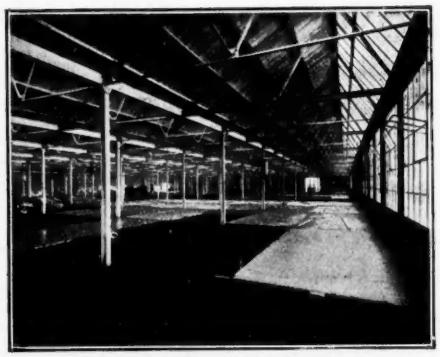
### Necessity of Re-heating in Bottle Manufacture

The necessity of a re-heating period immediately after the transfer, in the automatic production of bottles, was another point which was stressed by Professor Turner. Sets of data were given for bottles made on an O'Neill and on an Owens machine. The neck temperatures were always much less than those for other parts of the bottles. Further, figures were quoted for mould temperatures as obtained years ago by the Glass Research Association and by the Department of Glass Technology of Sheffield University. It was hoped that such very necessary basic data would be amplified by the Department of Glass Technology in order to help in defining the best conditions for manipulating glass.

# Longer Life for Concrete Floors

## Obtaining Dustproof, Waterproof and Fireproof Qualities

CONCRETE paving and flooring can be rendered dustless, waterproof, greaseproof and fireproof by topping it with half-an-inch thickness of "Ironite" (No. 1). This material is mixed dry with cement and clean, crushed granite or sharp clean sand and in the process of setting produces a surface which is impenetrable and non-absorbent. It permits heavy wear without sanding or rutting, does not powder under wear to form dust and is sanitary, in that it is not affected by oils and grease. The wearing properties of this topping are greatly superior to those of concrete, laboratory attrition tests

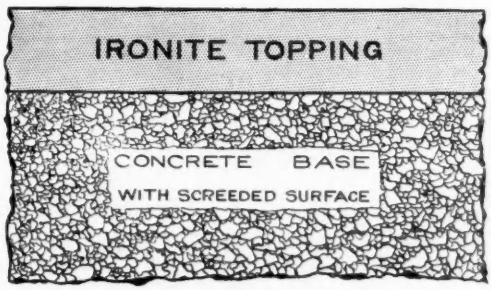


An "Ironite" Floor under Construction.

proving that Ironite floor toppings suffer only one-third loss in surface wear, and loss in weight, in comparison with good ordinary concrete floors.

For the past 20 years Ironite toppings have given excellent service in chemical works, by-product recovery plants, coke ovens, salt works, gasworks, glass works, power stations, pumping stations, warehouses and factories generally. The laying of Ironite toppings is not a specialist's job, but can be easily carried out by workmen accustomed to finishing a concrete floor with a steel trowel. The addition of Ironite in the topping is an actual economy, as the slight extra cost is more than justified by the avoidance of any repairs or maintenance charges. In preparing the topping, first-class Portland cement should be used, and clean crushed granite with not more than 20 to 25 per cent. of dust in its bulk, or clean sharp and graded sand, free from impurities. To each bulk of 100 lb. of cement should be added 20 lb. of Ironite No. 1 (about 3 lb. Ironite per square yard), the two materials being thoroughly mixed in the dry condition to an even colour. To one part of the mixture should be added two parts by bulk of crushed granite or sand, and clean water as for an ordinary granolithic floor. For exceptionally heavy wear 25 lb. of Ironite No. 1 to 100 lb. of Portland cement should be used (i.e., about 4 lb. Ironite per square yard).

For new floors required to withstand heavy wear and tear ½ in. Ironite topping, laid on a good concrete base, is sufficient, provided the Ironite topping is run in whilst the base is wet in order to secure the bond, and any man accustomed to finishing ordinary concrete with a steel trowel can make a perfectly satisfactory job bearing in mind the thorough mixing of the Ironite and cement to an even colour whilst dry, and keeping the topping damp for 5 to 7 days after being laid. On old floors ½ in. Ironite toppings have cured broken and dusty conditions. Here the method employed is to hack the old concrete to provide a key, and after clearing and brushing away all loose particles, thoroughly soak the surface to prevent the absorption of the gauging water into the dry base. At this stage the hacked face of the concrete base being uneven, it should be levelled up by running in cement and granite chippings or sand to within ½ in. of the finishing




Typical Section of "Ironite" Flooring.

surface, and followed whilst still wet by the ½ in. Ironite topping as previously described.

For rendering walls with Ironite, cement and sand the same proportions of Ironite and cement (20 lb. Ironite No. 1 to every 100 lb. Portland cement) plus two parts by volume of good sand are recommended. The waterproofing of walls with Ironite and cement slurry is simple, economical and permanent, costing only 1s. per square yard per coat. During the past 20 years millions of square yards of wall surface have been permanently waterproofed by this method, including tanks, reservoirs, towers and tunnels. Applied with a brush 1 lb. of Ironite No. 1 and 3 lb. of cement mixed dry and then gauged with water permanently waterproofs a surface area of 1 sq. yd.

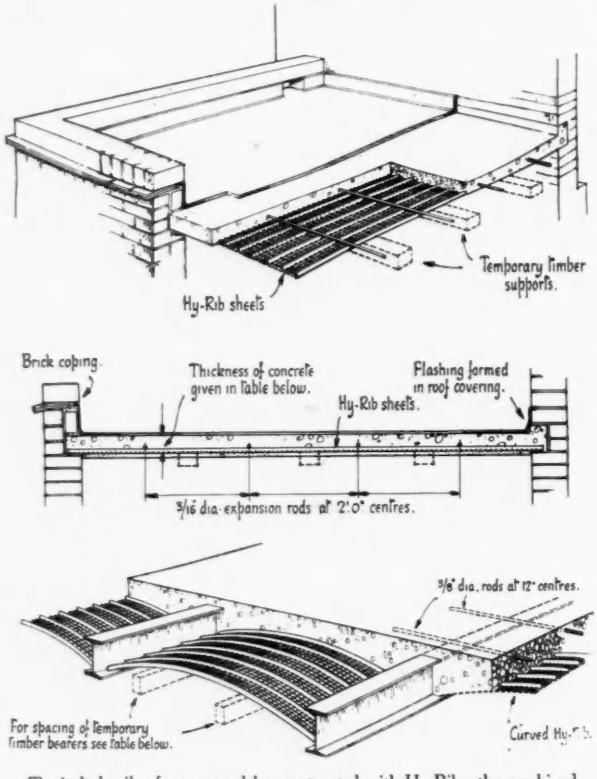
# A Practical Method for Reducing Building Costs

## Advantages of a Standard Concrete Reinforcement

THE building manager in charge of maintenance work at a progressive manufacturing concern is constantly faced with problems relating to renovation and extensions. His work, in many instances, involves the use of concrete, both in its mass form and as reinforced concrete. Reinforced concrete is often looked upon as work for specialists and to a certain extent this is true where big structures are involved, but for the subsidiary work which is always proceeding in and around a factory building the reinforced concrete so required may be dealt with by the maintenance staff.

In order to keep costs down to a low figure it is advisable, when dealing with reinforced concrete, to follow a system of construction which can be adapted to most of the problems. By so doing the men on the works maintenance staff become accustomed to the one system and are able to carry out the various jobs in less time than if differing methods of construction are employed. A reinforcement that can be adapted to almost all conditions is the ribbed steel mesh marketed under the name of "Hy-Rib." This ribbed mesh is made by the Trussed Concrete Steel Co., Ltd., and its full uses are described in a booklet that is complete with data and details relating to all types of reinforced concrete slabs. The booklet, which is issued to building engineers without charge, deals very exhaustively with floors, roofs, walls and partitions and gives in all cases full constructional drawings.

Hy-Rib is of rather ingenious design, being an expanded steel mesh strengthened with V-shaped ribs. The ribs stiffen the




Typical details of concrete slabs constructed with Hy-Rib—the combined reinforcement and centering

sheets and allow them to be easily handled as units without the disadvantages of unrolling and the subsequent recoiling action experienced with rolled reinforcement. Unpractised workmen are able to place the sheets without difficulty as they are merely nested along the side ribs to build up the complete "mattress" of reinforcement in the desired position. This combination of mesh and rib permits of slabs being constructed without close board shuttering under the concrete. The mesh is so fashioned that it retains the wet concrete on its upper surface whilst the ribs provide the sheets with the necessary rigidity to carry the weight of the wet slab between temporary bearers placed at wide intervals. Another point in favour of Hy-Rib construction lies in the fact that it is impossible to place the sheets in the wrong position in a slab. It is known that the design of reinforced concrete requires the steel reinforcement to be in a specified position at the bottom of the slab, where the maximum tensile stresses are developed. Should it so happen, in the process of pouring the concrete, that the reinforcement "rides up" into the slab then the strength of the slab is seriously affectd. This cannot happen when Hy-Rib is used because the concrete is laid actually on the sheets, thereby ensuring with absolute certainty that the steel is in the correct position at the bottom slab, where it takes up the full tensile stresses. The accompanying illustrations show how Hy-Rib is incorporated in slabs.

# Chemical Matters in Parliament

### Dyestuffs (Import Regulation) Act

IN the House of Commons on October 26, Mr. Denman (Leeds, Central) asked the President of the Board of Trade whether it was intended this year to include the Dyestuffs Act in the Expiring Laws (Continuance) Bill.

The Parliamentary Secretary to the Board of Trade (Dr. Burgin) replied that he hoped to be in a position to make a statement on this matter shortly.

Mr. Denman: Does the hon. gentleman realise the hardship of the colour users in having a customs duty imposed on them on top of the Dyestuffs Act?

Dr. Burgin: When I said shortly it means reasonably quickly, but not immediately.

Mr. Rhys Davies (Lancaster, Westhougton): Can the hon. gentleman say when the Expiring Laws Continuance Bill is likely to be produced, whether in this Session or the new Session?

No reply was given.

### Industrial Silicosis and Asbestosis

On October 27, Mr. Jamieson (Glasgow, Maryhill) asked the Home Secretary whether he would state the number, down to the last convenient date, of persons employed in the asbestos industry who had been medically examined in pursuance of the Silicosis and Asbestosis (Medical Arrangements) Scheme in England and Wales and Scotland, respectively; the total amount paid by employers to the medical expenses fund in respect of such examinations; and the number of persons certified by the medical board as totally disabled or suspended from employment as suffering from asbestosis.

Sir J. Gilmour replied that since June 1, 1931, when the Silicosis and Asbestosis (Medical Arrangements) Scheme came into force, 1,535 workmen had been examined under the scheme in the asbestos industry in England and Wales and 80 in Scotland. The total amount paid by employers to the Medical Expenses Fund in respect of these examinations was £2,300. Certificates of total disablement or suspension on account of asbestosis or asbestosis accompanied by tuberculosis had been issued in 30 cases in England and Wales and two cases in Scotland.

Mr. Jamieson: In view of the large expense incurred by employers and the small number of men found to be unfit for work, will the right hon. gentleman consider rescinding or modifying this scheme?

Sir J. Gilmour: No, sir. I think that this new experiment is fully justified.

### Increasing Chemical Demand in Brazil

EXPANDING consumptive demand is reported for caustic soda, soda ash and other heavy chemicals in Rio de Janeiro. If the present trend continues importers expect to place larger orders.

# Alleged Infringement of Artificial Silk Patents

## British Celanese, Ltd. v. Courtaulds, Ltd.

SITTING in the Chancery Division on Tuesday, Mr. Justice Clauson commenced the hearing of an important patent action by British Celanese, Ltd., Celanese House, Hanover Square, W., against Courtaulds, Ltd., of St. Martin-le-Grand, E.C. The claim was for injunctions restraining the infringement of four patents relating to the production of artificial silk.

The plaintiff company alleged that between January, 1926 and July, 1931 the defendants at their Coventry works made or sold materials and used machinery constructed in breach of the patents. Infringement of all the patents was denied and the defendant company alleged that they were invalid on various grounds, chiefly prior publication and prior common general knowledge. They counter-claimed for revocation of the patents on these grounds.

Sir Arthur Colefax, K.C., Mr. Craig Henderson, K.C., Mr. E. J. Neep and Mr. H. D. Russell Clarke, appeared for the plaintiff company, and Mr. James Whitehead, K.C., Sir Stafford Cripps, K.C., Mr. Trevor Watson, K.C., and Mr. G. Tookey, represented defendant company.

### Four Patents Involved

Sir Arthur Colefax, opening the case for the British Celanese, Ltd., said the four patents were divided into two groups, three being concerned with the production of artificial silk by the dry spinning or acetate process, and the fourth not wholly connected with that production, has been granted originally to Vickers, Ltd. There was another process—the viscose process—which was much less used than that which he had mentioned—the acetate process. The plaintiffs were the pioneers of the production of artificial silk by this process and its production had grown so much that to-day it was an important industry, not only in this country, but in the United States and Canada. The first of the patents in the group of three was concerned with the form and solidification of films composed of a derivative of cellulose. The second patent was concerned with the twisting and simultaneous winding into a thread of a number of filaments as they were produced. The third patent was concerned with the production of silk of a desired quality and uniformity and of the desired denier. This meant the weight in grammes of 9,000 metres in length.

Acetate silk, said counsel, was never produced commercially until the date of the plaintiff company's first patent and it was in those circumstances that the case came into Court. Courtaulds were the pioneers of a viscose silk industry and had attained an unchallengeable position in that industry in this country. But about 1926 or later, whether or not because Celanese products had commanded a higher price than their (Courtaulds') products they were minded to experiment in the production of acetate silk. For the last three years or so the plaintiff company had found that they were competing with them in their production.

"What we are complaining of here," said Sir Arthur, "is the use by Courtaulds of processes and steps and apparatus which I shall submit have been inspired at every turn by a knowledge of the specifications of my client's patents. So far as the two first patents are concerned they follow as closely as possible exactly what is described in the patents." So far as the documents relied on as anticipations of the patents were concerned counsel said some of them served no other purpose than to fill a wastepaper basket. They certainly disclosed no practical application.

### Wet Spinning and Dry Spinning

Speaking generally upon the question of artificial silk, Sir Arthur said that for many years before 1920 the article had been produced in large quantities in this country and in the United States. There was a broad distinction to be made between the processes. That distinction imparted expressions with which people in the United States were well acquainted, *viz.*, "wet" and "dry." The wet processes were processes in which the production of artificial silk depended upon the coagulation upon the chemical reaction proceeding in an aqueous bath. The dry processes were evaporative or dry spinning processes, the artificial silk being formed by evaporation of a solvent from a solution of a cellulose derivative. He next dealt in detail with each of the prior specifications relied on by the defendant company as invalidating the patents in suit. There were fourteen of these dating from 1887 to 1911. He said one of the things to be avoided in the production of artificial silk was the occurrence of a dangerous explosive mixture of acetone and air near the person working spinning machinery. By means of the plaintiff company's patents it was possible to obtain such a degree of evaporation that the filament could be led downwards and wound straight away. But there was nothing in the only relevant art in the prior specification that came anywhere near it.

### Non-Utility of Prior Specifications

Continuing his opening on Wednesday, Sir Arthur referred to several of the prior specifications as not being the slightest use in making any advance in the art of producing silk by dry spinning with which the first of the plaintiff's patents were concerned. They might hear from defendant's counsel that they were in a position to prove that there had been manufacture of artificial silk consisting of acetate of cellulose, while the process was a wet one. From information he had he believed that it had been manufactured abroad in an isolate case, but it was not successful. Among the documents he read were specifications of British, Swedish, German and French patents, none of which he said described anything that was subject of the plaintiff's invention.

HIS LORDSHIP: I must ask you to regard tenderly any interruption I make, because at present I don't understand the point in the case.

Sir ARTHUR went on to deal with six experiments which Courtaulds carried out in the presence of plaintiff's experts and which were alleged to be pertinent to the issues in relation to their particular patent. He summarised the position with regard to all prior publications and urged that not one of them described the process which was the subject of the patent, nor anything which would give that success which characterised the plaintiff's process. He protested against what he had no doubt would be an attempt to look at each feature of that process and say whether or not in any or prior publications this or that feature could be pointed out. This process, he declared, must be regarded as a whole, as being the process which was claimed. It was carefully defined in the claim and each feature expressed in the claim was not only to be regarded as an element in the process, but as co-operating with the other features or steps so as to make it possible to spin successfully by a multiplicity of filaments simultaneously in a dry spinning process—a thing which had never previously been accomplished—at a speed which had never been approached in the existing dry spinning art. The co-operation of the several features constituted their claim and that was the claim which they said had been clearly infringed.

### The Basis of a New Art

The plaintiffs contended with some confidence that their patent was valid and covered an invention of enormous utility, which was the basis of an entirely new art and was universally employed in it. He submitted that the defendants when they were minded to have their territory of viscose silk and became competitors in the manufacture of cellulose acetate silk adopted their patents.

Sir Arthur went on to deal with the second patent which was concerned with twisting and simultaneous spinning of the filaments and he handed to his lordship a bobbin of silk, the thread of which he said consisted of 26 filaments. The plaintiffs were the first to disclose such a process, a cap spinning device being the means indicated. There was no question that the defendants, adopted the procedure he described throughout their factory. Having decided to compete with the plaintiffs they paid the latter the compliment of sticking as closely as they could to the inventions which plaintiffs had described in the specifications of their patents.

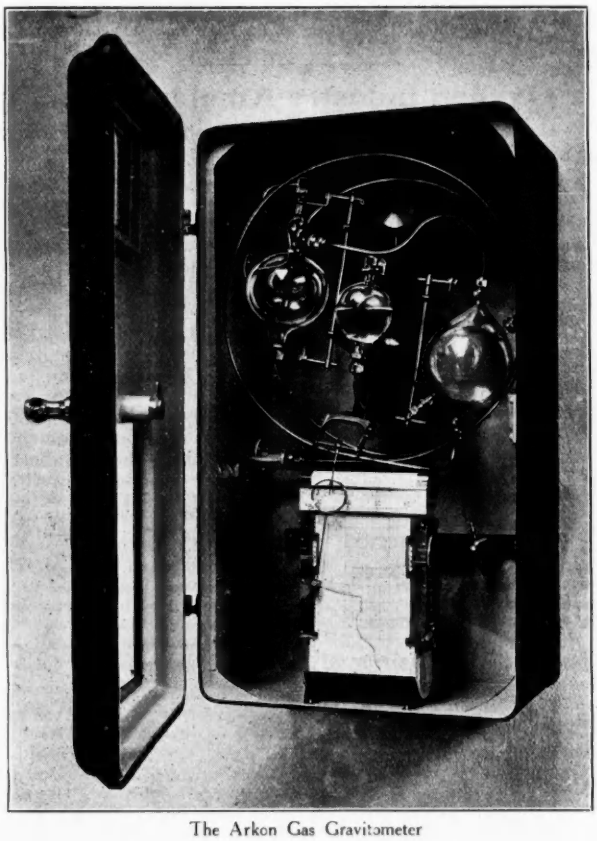
The hearing is proceeding.

# Automatic Density Determinations

## Instruments Applicable to Liquid and to Gases

ARKON liquid gravitometers and gas gravitometers are finding useful fields of application in many chemical works and also in factories where chemicals are employed in manufacturing processes. With these instruments density can be recorded in any desired graduations, *e.g.*, Beaumé, Brix or Balling degrees, a a perecentage or as specific gravity. For liquid, the accuracy is guaranteed to ± 1 per cent., for gas to ± 2 per cent. of the range, which is optional within wide limits. The effective recording height is 100 mm. on a monthly chart of the unrolling strip type having a travel of 20 mm. per hour. The pressure range is vacuum to 1 atmosphere pressure and higher if specified.

The special feature of the liquid density recorded is the automatic compensation for variations in temperature of the liquid under test. Chart readings give the actual concentration of the liquid and all temperature correction by calculation is dispensed with; moreover, the readings are given with any desired temperature as base. No time lag occurs, as in



The Arkon Gas Gravitometer

those instruments working on the hygrometer method which require a large vessel to accommodate the float operating the pen gear, for the fresh liquid flowing in takes times to displace the earlier liquid. The Arkon recorder works on the principle of a balance. The liquid flows through a vessel forming the left-hand side of the balance. The counterbalance is not of fixed weight, but varies in accordance with the temperature of the liquid under test. The method employed is therefore entirely automatic.

The Arkon gas gravitometer, here illustrated, is a simpler instrument working on the principle of the direct relation between the density of the gas and the draught created by the gas in ascending a tube to burn at the top. This is by no means an innovation, its merits lying more in the practical and constructional application of a well-known principle. Apart from the standard features already described, the instrument incorporates a special hinged float which ensures a large and certain pen measurement.

Both of these instruments are obtainable from Walker, Crossweller and Co., Ltd. The casings are made of metal, and the actual liquid or gas receptacles are made of a strong special glass which will resist temperatures from 0° to 212° F. For the connecting tubes brass, copper, nickel, steel or special types of material are employed according to the nature of the liquid or gas to be handled.

# British Celanese Developments

## Four New Products to be Marketed

IN the course of his speech at the thirteenth ordinary general meeting of British Celanese, Ltd., held in London on October 27, Dr. Henry Dreyfus, the chairman and managing director, stated that the company is now developing and marketing at least four new products, namely, artificial wool, a new high-viscosity acetate yarn, a new yarn with improved dyeing qualities, and transparent paper.

### Artificial Wool and Schappe

It has been due to intensive research work, which has been brought to a degree of practical and economical perfection, that the company is now entering into the artificial wool and schappe business. This development is expected to lead up to large sales in the future, and machinery is actually being installed for this purpose. The products made with artificial Celanese wool are claimed to be capable of replacing those made with natural wool. It is also claimed that such products will be superior to those made with the artificial wool produced by the viscose process, especially as Celanese artificial wool is particularly resistant to sudden changes of temperature in view of its insulating qualities against heat and cold, which properties are not contained in viscose.

In regard to the new high-viscosity products, Dr. Dreyfus took the trouble of pointing out that when one speaks of acetate of cellulose, there are hundreds of different qualities. You may have acetates which appear the same when you look at them, and yet they are absolutely different when you study their viscosities, and you may manufacture three different acetates by the same process which may have all the same qualities, except that their viscosities, which is one of the most important points, are absolutely different; and remember that the lower the viscosity of the acetate the more the cellulose contained in it is depolymerised or destroyed, and, vice versa, the higher the viscosity the more the cellulose is preserved. Acetates of higher viscosity are therefore much more valuable than those of lower viscosity, as their dry and wet strengths are much higher, and in consequence their durability in wearing and washing is far superior. Higher viscosity acetates which it is intended to introduce during the present financial year, will have four to five times the viscosity of those at present marketed by the company. "The viscosity of our present acetate," Dr. Dreyfus added, "is twice that of the products made by the other manufacturers in this country."

### New Dyeing Qualities

Dealing with the new types of Celanese yarns which, while retaining all the high properties of Celanese, can be dyed and printed and otherwise treated exactly in the same way as viscose and cotton, it was pointed out that such yarns will have a strength superior to that of natural silk, and will be two or three times as strong as viscose. The company is now installing machinery for producing these products on a commercial scale, and expect to deliver large quantities during the present financial year. They can be produced with finer filament denier than natural silk, if required.

British Celanese, Ltd., now possess over 800 patents relating to all kinds of items connected, directly or indirectly, with their business. During the last six or seven years, together with the American company, they have spent not far short of £1,000,000 on research work.

In connection with the marketing of transparent paper, however, the company may meet powerful competitors, as Courtaulds have already planned to supply the entire home demand for this particular product.

# News from the Allied Industries

### Whale Oil

IT IS REPORTED FROM TOENSBERG that whale oil, amounting to 5,300 tons of the 193, and 1931 production, has been sold to Germany at a price of £13 per ton.

### Artificial Silk

A PETITION FOR THE WINDING-UP of the Rayon Manufacturing Co. (1927), Ltd., is to be heard on November 7. It was recently announced that a receiver and manager had been appointed.

THE PRODUCTION OF RAYON YARN and waste in the United Kingdom for September was 5.70 million lb., comparing with 4.62 million lb. for August and 4.54 million lb. for September last year.

### Canning

THE RAPID DEVELOPMENT of the canning industry in this country was emphasised at the sixth annual convention of the National Food Canning Council, which was opened at Birmingham on October 27. Sir Edgar Jones, the president, particularly stressed the advance made on the scientific and technical side as auguring well for future extension. Some problems affecting the export trade were dealt with by Dr. Hoist, head of the Campden Research Station. He said that our acid fruits were particularly acceptable in tropical climates, where the majority of the indigenous fruits were very sweet. Research was being directed to counteracting the chemical reaction between the fruit and the metal cans which resulted from very high temperatures.

### Mineral Waters

REPRESENTATIVES of the National Union of Mineral Water Manufacturers' Association have left Liverpool in the Cunard liner " Scythia " to attend an international conference organised by the American Bottlers of Carbonated Beverages to be held at Cleveland, Ohio, November 14 to 18. The delegates are headed by the president of the National Union of Mineral Water Manufacturers, Mr. J. W. Kerr (who is also president of the Birmingham Association). Included in the party are Mr. Robert Barr, vice-president of the Scottish Association, Mr. J. N. Robb, president of the Dundee Association, Mr. John Campbell, past vice-president of the Scottish Federation, Mr. James Lovett, of Leicester, and Mr. Clifford H. Wallis.

### Sugar

SPEAKING AT READING UNIVERSITY on the essentials of a national agricultural policy, Lord Astor criticised the subsidy on sugar beet and the wheat quota. He said that last year it cost the country £11,000,000 to grow sugar which they could have imported for a little less than £5,000,000. To his mind it was gross extravagance to continue attempting to grow sugar beet in this country with a subsidy when the sugar beet industry could never stand on its own legs.

THE CUBAN NATIONAL SUGAR INSTITUTE has recommended to the president, General Machado, that the production of sugar in 1933 should be limited to 2,000,000 tons, of which the export quota to the United States should be 1,115,000 tons. The institute further recommends that grinding should start on February 1 next year.

### Rubber

THE DUNLOP RUBBER CO. announces that it will redeem on February 4, 1933, at 103 per cent., the whole of the 6 per cent. second debentures then outstanding. It is not proposed to replace these debentures by the issue of any new security. This will not affect the drawing of these debentures to be redeemed on January 1 next. Immediately after the drawing, notice will be given to the holders of drawn debentures, which will be paid off on January 1 next at 102 per cent. The company has an issued capital of £12,251,045, consisting of £1,000,000 in 6½ per cent. "A" preference shares of £1, £1,000,000 in 7 per cent. "B" preference shares of £1, £2,400,000 in 10 per cent. "C" preference shares of 16s., and £7,581,045 in ordinary stock. In addition to the debentures referred to above, of which £1,469,780 is at present outstanding, there is outstanding £4,476,477 in 5½ per cent. first mortgage debenture stock.

### Paper

A FIERCE FIRE BROKE OUT at Waterside paper mill, near Darwen this week, and damage was done to the extent of nearly £5,000. The mill is in a secluded part of the country, and is mainly engaged on Government contracts. It is hoped to resume partial running of the mill within a few days.

### Non-Ferrous Metals

IT IS UNDERSTOOD that a new concern is about to be formed, with resources of £1,000,000, for the purpose of entering the battery, accumulator and oxide business in this country. This industry is among the most profitable ones in the United Kingdom, and its successes are largely due to the high quality of Empire lead (which always commands a premium over Mexican lead), and to the prices charged by manufacturers, which do not move proportionately to the fall in lead. Lead has fallen about 70 per cent., with disastrous effects upon producers' profits, while those of manufacturers are thereby enhanced. It will be the policy of the new enterprise to keep its products at so low a price level as to stimulate consumption of the metal, which is being seriously affected by current charges for manufactured articles.

## Oxygen Industry Amalgamation

### Proposals Approved

AN extraordinary general meeting of the shareholders of the British Oxygen Co., Ltd., was held at the Great Eastern Hotel, E.C., on October 27, to approve a conditional agreement entered into by the company with Metal Industries, Ltd., and Oxygen Industries, Ltd. Mr. K. S. Murray, chairman and managing director of the company, presided.

In his opening remarks the chairman laid stress on the distinction to be drawn between the competitor who merely paid them the compliment of adopting their own methods, in the belief that it was only necessary to set up local competition in order to secure a profitable slice of their trade, and the competitor who spent his capital in exploiting some new system in connection with the production or supply of oxygen. In the first case there was only one way of dealing with the competition, and that was to fight it until the economic fallacy of a new oxygen gas supply, where a superabundance already existed, became obvious to the competitor. In the second case the circumstances were quite different, and it was important to differentiate between the competitor who had nothing of the least value to offer and competitors, like Metal Industries, Ltd., and its subsidiary, Oxygen Industries, Ltd., who, with strong financial support, were operating a system which he considered capable of useful development.

### Acquisition of Valuable Patents

Before dealing with the terms of the agreement which the company had made with Metal Industries, Ltd., and its subsidiary, Mr. Murray explained briefly the various circumstances which had brought it about. The agreement, he said, was mainly concerned with the supply of oxygen transported in the liquid state, and he gave an interesting review of the development of that system on alternative lines, referring also to legal complications regarding patent rights, a settlement of which, satisfactory to all parties, is provided for in the agreement. Under the terms of the agreement the company acquired all the Heylandt British patents hitherto operated by Metal Industries, Ltd., for the storage, transport, and evaporation of liquid oxygen. These, with rights which the company already possessed for the alternative method of evaporating the liquid, coupled with their facilities for experimental research, now placed them in an excellent position for developing the liquid oxygen system under the best conditions alongside their existing cylinder business.

For these patent rights and goodwill, as well as valuable tangible assets consisting of freehold properties, fixed plant and machinery, cylinders, loose tools and stock-in-trade, the British Oxygen Co., Ltd., is allotting to the vendor companies (Metal Industries, Ltd., and Oxygen Industries, Ltd.) 325,000 ordinary shares of £1 each, all credited as fully paid up, and to rank *pari passu* as from January 1 next with the existing ordinary shares.

# Weekly Prices of British Chemical Products

## Review of Current Market Conditions

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

THE London chemical market has received a fair amount of inquiry during the week, with prices of a number of products showing a much firmer tendency. Stocks of coal tar products remain short, and market conditions and prices are unchanged from last week. The week-end unexpected development in the labour trouble at the spinning end of the Lancashire cotton trade has been an unsatisfactory feature, although so far it has had no noticeable reaction upon the Manchester chemical market except to accentuate the tendency of buyers to restrict commitments to near delivery dates. The approach of the end of the year with possibility of price modifications in various sections of the market, is also not without its influence in this respect. In the meantime, business continues on moderate lines with prices steady in most sections. The Scottish heavy chemical market is slightly improved, but there are no material alterations in prices. There are no price changes to report in the markets for intermediates and dyes, wood distillation products, perfumery chemicals, essential oils, or nitrogen fertilisers. The latest prices for these products appeared in THE CHEMICAL AGE of October 22.

### General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £37 5s. to £39 5s.; pure 80% £38 5s. to £40 5s.; tech., 40%, £19 15s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; tech. 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON: 10½d. per lb., less 5%. MANCHESTER: 10½d.

ACID, CRESYLIC.—97/99%, 1s. 5d. to 1s. 7d. per gal.; 99/100%, 1s. 9d. to 2s.

ACID, FORMIC.—LONDON: £52 per ton.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s per ton; 50% by weight, £28 10s.; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £20 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £48 3s. to £48 15s. per ton in casks, £52 to £56 in kegs. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £46, ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—10½d. per lb. SCOTLAND: B.P. crystals, 10½d., carriage paid. MANCHESTER: 10½d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £22 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £22 10s. c.o.f. main U.K. ports for imported material; Cornish, nominal, £23 f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £24 10s. at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 10s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, power £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 2d. to 3s. 6d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4d. to 5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £45 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r, or ex works.

CREAM OF TARTAR.—LONDON: £4 5s. per cwt.

FORMALDEHYDE.—LONDON: £28 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£46 to £50 per ton.

LEAD ACETATE.—LONDON: White, £34 per ton. Brown, £1 per ton less. SCOTLAND: White Crystals £40 to £41 c.i.f. U.K. ports. Brown, £1 per ton less. MANCHESTER: White, £31 to £32; Brown, £30.

LEAD NITRATE.—£28 per ton. MANCHESTER: £28.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £18 to £19 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£54 per ton d/d.

NICKEL SULPHATE.—£54 per ton d/d.

PHENOL.—Small lots, 6½d. per lb. in 3-cwt. drums, bulk quantities down to 6d. per lb., delivery free U.K.

POTASH, CAUSTIC.—LONDON: £42. MANCHESTER: £39 to £40.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32. MANCHESTER: £30.

POTASSIUM CHLORATE.—3¾d. per lb. ex wharf London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £34. MANCHESTER: £37.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £29 per ton c.i.f. U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8¼d.; B.P., 8¾d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8¼d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot, £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums £18 15s. in casks. Solid 76/77% £14 10s. in drums 70/72% £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 10s. contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£21 to £22 per ton.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d/ 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton

extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM NITRITE.—Spot, £19 to £22 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 to £15 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.

SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11 10s.; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £16 10s. per ton f.o.b.

SULPHUR.—£12 per ton. SCOTLAND: Flowers, £12 10s.; roll, £12; rock, £9. Ground American, £12 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 4s. 6d. to 4s. 11d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.

ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

## Pharmaceutical and Fine Chemicals

AMMONIUM IODIDE.—17s. to 17s. 6d. per lb.

BISMUTH SALTS.—Carbonate, 6s. 10d. per lb.; Citrate, 9s. 3d.; Nitrate (cryst.), 4s. 7d.; Oxide, 10s. 6d.; Salisylate, 7s. 7d.; Subchloride, 10s. 3d.; Subgallate, 7s. 3d.; Subnitrate, 5s. 11d.

IODINE RESUB., B.P.—15s. 2d. to 19s. 3d. per lb.

IODOFORM, B.P., CRYST., PRECIP., OR POWDER.—18s. 2d. to 22s. 2d.

IRON AMMON. CITRATE, B.P.—1s. 7d. per lb.

POTASS. CITRATE, B.P.—1s. 5d. per lb.

POTASS. IODIDE, B.P.— 13s. 5d. to 15s. 11d. per lb.

QUININE SULPHATE.—2s. 6d. per oz.

SOD. CITRATE, B.P.C. 1911, 1s. 2d. per lb.; B.P.C. 1923, and U.S.P. 1s. 6d. per lb.

SODIUM IODIDE, B.P.—14s. 5d. to 17s. 6d. per lb.

SOD. POTASS. TARTRATE (ROCHELLE SALT).—75s. per cwt.

## Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—6d. to 6¾d. per lb. Crude, 60's 2% water, 2s. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.

ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 1s. 9d. to 1s. 11d.; Refined, 1s. 7d. to 1s. 9d.; Pale, 98%, 1s. 5d. to 1s. 7d.; Dark, 1s. 2d. to 1s. 3d. LONDON: 98/100%, 1s. 6d. Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.

ANTHRACENE OIL.—Strained, 4½d. per gal.

BENZOL.—At works, crude, 10d. to 11d. per gal.; standard motor, 1s. 6½d. to 1s. 7d.; 90%, 1s. 7d. to 1s. 8d.; pure, 1s. 10d. to 1s. 11d. LONDON: Motor, 1s. 7½d. SCOTLAND: Motor, 1s. 6½d. to 1s. 7½d.; 90%, 2s. 0½d. to 2s. 1½d.

CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3⅛d. f.o.r. North; 4d. to 4⅛d. London. MANCHESTER: 2¾d. to 3⅜d. SCOTLAND: Specification oils, 3⅜d to 4¼d.; washed oil, 4d. to 4⅛d.; light, 3⅜d. to 4⅛d.; heavy, 4⅛d. to 5d.

NAPHTHA.—Solvent, 90/160, 1s. 4d. to 1s. 5d. per gal.; 95/160, 1s. 8d.; 90/190, 1s. 1d. to 1s. 2d. LONDON: Solvent, 1s. 3⅛d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r SCOTLAND: 90/160. 1s. 3d. to 1s. 3½d.; 90/190, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, Hot-Pressed, £6 1s. 3d. per ton. Flaker, £10 per ton. Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.

PITCH.—Medium soft, £4 7s. 6d. to £5 per ton.

PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.

REFINED COAL TAR.—SCOTLAND: 4¾d. to 5d. per gal.

XYLOL.—1s. 9d. to 2s. per gal.; Pure, 1s. 10d. to 2s. 2d.

TOLUOL, 90%.—2s. to 2s. 4d. per gal.; Pure, 2s. 4d. to 2s. 8d. per gal.

## Latest Oil Prices

LONDON, Nov. 2.—LINSEED OIL was steady. Spot, small quantities, £19; Nov., £16 5s.; Nov.-Dec., £16 7s. 6d.; Jan.-April, £17 2s. 6d.; May-Aug., £18 2s. 6d., naked. RAPE OIL was inactive. Crude extracted, £29; technical refined, £31, naked ex wharf. COTTON OIL was steady. Egyptian, crude, £22 10s.; refined common edible, £25; deodorised, £27, naked, ex mill. TURPENTINE was dull. American, spot, 61s. 6d. per cwt.

HULL.—LINSEED OIL, spot, £16 12s. 6d.; Nov., £16; Dec., £16 5s.; Jan.-April, £16 15s.; May-Aug., £17 15s. per ton. COTTON OIL.—Egyptian, crude, spot, £22; edible, refined, spot, £24; technical, spot, £24; deodorised, £25 10s. per ton, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £22 10s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £30 10s.; deodorised, £34 10s. per ton. RAPE OIL.—Crushed/extracted, spot, £28 10s.; refined, £30 per ton. SOYA OIL.—Crushed/extracted, spot, £23 10s.; deodorised, £26 10s. per ton. COD OIL, 16s. per cwt. CASTOR OIL.—Pharmacy, spot, 42s.; first, 37s.; second, 32s. per cwt. TURPENTINE.—American, spot, 64s. per cwt.

# Tariff Changes

**Czechoslovakia.**—An agreement, dated October 6 and effective as from October 13, supplementary to the German-Czechoslovak Commercial Treaty of June 29, 1920, renews those provisions of the former supplementary agreement of November 12, 1931, whereby (1) coal-tar dyestuffs incorporating not more than 80 per cent. of common salt (sodium chloride), Glauber salt (sodium sulphate), soda (sodium carbonate) or dextrin, or mixtures of these substances, when imported into Czechoslovakia from Germany, are to be treated for tariff purposes as coal-tar dyestuffs under Tariff No. 625, and (2) applications for licences to import slaked lime (Tariff No. 150a) into Czechoslovakia from Germany are to be accorded favourable treatment by the Czechoslovak Government.

**Canada.**—An Order-in-Council of October 3 repeals Item 200 (a) of the Canadian Customs Tariff and substitutes the following item, effective from October 3:—"200 (a) Regenerated cellulose and cellulose acetate, transparent, in sheets, not printed, and manufactures of regenerated cellulose or of cellulose acetate—British Preferential Tariff 20 per cent. ad valorem. Intermediate Tariff 30 per cent. ad valorem and General Tariff 35 per cent. ad valorem. The previous duties on regenerated cellulose and cellulose acetate, transparent, in sheets, not printed, were, respectively, free, 10 per cent. and 10 per cent."

## British Colour Council Colour cards

THE British Colour Council issued its first shade card in May, 1931, and silk, wool, hosiery, and leather cards were issued for the spring and autumn of 1932. As the work of the Council became known, applications for membership were received from all parts of the world, and a demand for a cotton card was voiced. Therefore, in addition to the cards already mentioned, a cotton card has been prepared, and these cards are now produced months in advance of the season. The colours promoted by the Council have assisted all sections of industry, and have been instrumental in facilitating communications with countries abroad. Information and sets of cards are to be sent to His Majesty's Trade Commissioners in all the more important cities of the world, which, together with the fact that trade and fashion journals now feature British Colour Council colours, should make the colours still more widely known and used. The Council hopes to have the support of Lancashire firms in its new venture, produced for the benefit of the cotton industry. Investigations are being made in order to co-operate the various sections of industry dealing with men's wear and also with interior house decoration.

## Nobel Prize Award

THE Nobel Prize for Medicine for 1932 has been awarded in equal parts to Professor Edgar Douglas Adrian, F.R.S., Fellow of Trinity College, Cambridge, and to Sir Charles Sherrington, F.R.S., Waynflete Professor of Physiology at Oxford, for their discoveries concerning the functions of the neurone. Sir Charles Sherrington is a member of the Medical Research Council of the Privy Council. He was Brown Professor at the University of London, and lecturer of physiology at St. Thomas's Hospital, London; and was Professor of Physiology at Liverpool University from 1895 to 1913. From 1910 to 1918 he was a member of many committees, set up by the Government. His work was concerned mainly with the sense organs and nerves, and the electrical investigation of the messages up and down the muscles. Professor Adrian is Foulerton Professor of the Royal Society and a member of the Medical Research Council. He was educated at Westminster, Trinity College and St. Bartholomew's Hospital. He became a Fellow of his college in 1913 and University Lecturer in 1920. In 1925 he was Oliver Sharpey Lecturer at the Royal College of Physicians, and gained the Baly Medal in 1929.

# Inventions in the Chemical Industry

## Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications Accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

### Specifications Accepted with Dates of Applications

PROCESS FOR THE MANUFACTURE OF ARTIFICIAL RESINS, MOULDING COMPOSITIONS AND ARTIFICIAL MASSES, BY CONDENSATION OF DICYANDEIAMIDE WITH FORM ALDEHYDE. K. Ripper. July 30, 1930. 382,271.

MANUFACTURE AND PRODUCTION OF SHAPED ARTICLES FROM MASSES CONTAINING SILICON. J. Y. Johnson (*I.G. Farbenindustrie*). July 15, 1931. 382,295.

MANUFACTURE AND PRODUCTION OF CONDENSATION PRODUCTS. J. Y. Johnson (*I. G. Farbenindustrie*). July 22, 1931. 382,301.

APPARATUS FOR PERFORMING REACTIONS BETWEEN MOLTEN SUBSTANCES AND GASES. I. G. Farbenindustrie. Aug. 25, 1930. 382,314.

PURIFICATION OF TRINITROTOLUENE. Imperial Chemical Industries, Ltd., and G. P. Davies. July 27, 1931. 382,322.

PROCESS FOR THE MANUFACTURE OF PYRIDINE DERIVATIVES. E. Koenigs and H. Greiner. July 27, 1931. 382,327.

PROCESS FOR THE MANUFACTURE OF SULPHURISED DERIVATIVES OF PHENOLS. Chemische Fabrik vorm. Sandoz. Aug. 2, 1930. 382,333.

PROCESS FOR TREATING NATURAL AND ARTIFICIAL CELLULOSE FIBRES WITH ALKALI. Chemische Fabrik vorm. Sandoz. Aug. 20, 1930. 382,345.

PROCESS FOR CRACKING HYDROCARBONS. Vereinigte Stahlwerke Akt.-Ges. Aug. 27, 1930. 382,355.

PROCESS AND APPARATUS FOR PRECIPITATING AND SEPARATING ALUMINA HYDRATE FROM SOLUTIONS OF ALKALI METAL ALUMINATES. Electric Smelting Aluminium Co. Oct. 10, 1930. 382,366.

MANUFACTURE OF SULPHAMIC ACIDS OF 2-AMINOANTHRAHYDROQUINONE-DISULPHURIC ACID ESTERS. Durand and Huguenin A.-G. Sept. 5, 1930. 382,367.

PRODUCTION OF MIXED FERTILISERS CONTAINING AMMONIUM NITRATE WHICH ARE STABLE WHEN STORED. J. Y. Johnson (*I. G. Farbenindustrie*). Sept. 5, 1931. 382,368.

PROCESS FOR TREATING NATURAL AND ARTIFICIAL CELLULOSE FIBRES WITH ALKALI. Chemische Fabrik Vorm. Sandoz. Sept. 16, 1930. 382,373.

PROCESS FOR THE MANUFACTURE OF AMORPHOUS CARBONS. Ateliers Generaux de Construction Soc. Anon. Jan. 16, 1931. 382,406.

DYESTUFFS OF THE DI-BENZANTHRONE SERIES CONTAINING CHLORINE, AND THEIR APPLICATION IN DYEING. Soc. of Chemical Industry in Basle. Oct. 18, 1930. 382,411.

MAGNESIUM ALLOYS FOR THE PRODUCTION OF CASTINGS IN PERMANENT MOULDS. I. G. Farbenindustrie. Nov. 11, 1930. 382,420.

HARDENING PROCESSES FOR ALUMINIUM ALLOYS. H. C. Hall. Oct. 24, 1931. 382,422.

PRODUCTION OF ASPHALT AND TAR EMULSIONS. Hanseitische Mühlenwerke A.-G. Nov. 15, 1930. 382,432.

MANUFACTURE OF ARYLAMINO-2-HYDROXY-NAPHTHALENE-CARBOXYLIC ACIDS. W. W. Groves (*I. G. Farbenindustrie*). Dec. 2, 1931. 382,449.

MANUFACTURE OF HYDROXY-BENZO-QUINOLINE-CARBOXYLIC ACIDS. W. W. Groves (*I. G. Farbenindustrie*). Dec. 3, 1931. 382,450.

MANUFACTURE OF A 1-HYDROXY-ANTHRACENE-CARBOXYLIC ACID. W. W. Groves (*I. G. Farbenindustrie*). Dec. 8, 1931. 382,456.

SEPARATION OF ACETIC ANHYDRIDE FROM ADMIXTURE WITH ACETIC ACID AND WATER. A. H. Stevens (*E. Berl*). Feb. 15, 1932. 382,503.

RECOVERY OF BROMINE. Kali-Forschungs-Anstalt Ges. Dec. 17, 1931. 382,512.

STARCH-CONVERSION PRODUCTS, AND PROCESSES OF PREPARING THE SAME. American Diamalt Co. April 30, 1931. 382,517.

PROCESS FOR PURIFYING AN OPACIFYING AGENT FOR ENAMELS, GLAZES, AND GLASSES. A. H. Stevens (*American Smelting and Refining* Co.). March 14, 1932. 382,524.

REFINING OF LIQUID HYDROCARBONS BY MEANS OF LIQUID SULPHUR DIOXIDE. Edeleanu Ges. May 2, 1931. 382,556.

PROCESS FOR THE MANUFACTURE OF 2- AND 4-HYDROX'-3.1-DIHODOPYRIDINE-MONOCARBOXYLIC ACIDS. Schering-Kahlbaum A.-G. Sept. 22, 1931. 382,609.

### Complete Specifications open to Public Inspection

PROCESS FOR DEHYDRATING OR WETTING AQUEOUS SUBSTANCES WITH ORGANIC LIQUIDS. *Naamlooze* Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 23, 1931. 25391/32.

PROCESS FOR THE PRODUCTION OF ALCOHOLS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 21, 1931. 27228/32.

MANUFACTURE OF ORGANO-LEAD SALTS OF PHENOLS. E. I. Du Pont de Nemours and Co. Oct. 20, 1931. 29112/32.

ANTISEPTIC ICE AND ITS APPLICATION. E. I. Du Pont de Nemours and Co. Oct. 22, 1931. 29235/32.

SOIL DISINFECTANTS. Romosten Chemische Ges. Oct. 20, 1931. 29267/32.

PROCESS FOR THE PREPARATION OF CALCINED TRI-ALKALI PHOSPHATES. Chemische Fabrik Budenheim A.-G. Oct. 21, 1931. 29289/32.

MANUFACTURE OF CELLULOSE NITRATE. E. I. Du Pont de Nemours and Co. Oct. 22, 1931. 29472/32.

PROCESS FOR THE MANUFACTURE OF DISPERSIONS OF CONVERSION PRODUCTS OF RUBBER. I. G. Farbenindustrie. Oct. 24, 1931. 29483/32.

MANUFACTURE OF SUBSTITUTED AMIDES AND COMPOSITIONS CONTAINING SAME. E. I. Du Pont de Nemours and Co. Oct. 24, 1931. 29675/32.

METHOD OF DESULPHURISING COAL-DISTILLATION GASES. Gewerkschaft M. Stinnes. Oct. 23, 1931. 29745/32.

### Applications for Patents

PRODUCTION OF SULPHURIC AND NITRIC ACIDS. P. Kachkaroff. Oct. 19. (France, Nov. 12, '31.) 29269.

PRODUCTION OF POTASSIUM NITRATE. Kali-Forschungs-Anstalt Ges. Oct. 21. (Germany, Jan. 28). 29480.

DISTILLATION OF CARBONACEOUS, ETC., MATERIALS. B. Laing. Oct. 19. 29234.

CONVERSION OF HIGH BOILING POINT HYDROCARBONS INTO LOWER BOILING POINT HYDROCARBONS. M. A. Marconi. Oct. 19. 29302.

TREATMENT OF TAR OILS. M. A. Marconi. Oct. 19. 29303.

PRODUCTION OF SULPHURIC AND NITRIC ACIDS. C. Matignon. Oct. 19. (France, Nov. 12, '31.) 29269.

DESTRUCTIVE HYDROGENATION OF CARBONACEOUS MATERIALS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 18. (Holland, Nov. 14, '31.) 29059.

PRODUCTION OF LACTIC ACID. Standard Brands, Inc. Oct. 21 (United States, Oct. 29, '31.) 29404.

CRYSTALLISATION PROCESSES. Aktieselskapet Krystal and W. J. Tennant. Oct. 28. 30255.

MAGNESIUM ALLOYS. C. Arnold (*Dow Chemical Co.*) Oct. 24. 29686.

DERIVATIVES OF 2 HYDROXYDIPHENYL. C. Arnold (*Dow Chemical Co.*). Oct. 27. 30187.

PROCESS FOR ISOLATION OF PIPERITONE. J. W. Blagden, Howards and Sons, Ltd., and W. E. Huggett. Oct. 25. 29844.

DYESTUFFS INTERMEDIATES. S. Coffey, Imperial Chemical Industries, Ltd., and J. E. Schofield. Oct. 28. 30330.

MAGNESIUM BASE ALLOYS. Dow Chemical Co. Oct. 26. (United States, Feb. 1.) 29990.

MANUFACTURE OF SUBSTITUTED AMIDES, ETC. E. I. Du Pont de Nemours and Co. Oct. 24. (United States, Oct. 24, '31.) 29675

MANUFACTURE OF SYNTHETIC RUBBER. E. I. Du Pont de Nemours and Co. Oct. 26. (United States, Nov. 2, '31.) 29956.

PRINTING COLOURS. E. I. Du Pont de Nemours and Co. Oct. 26. (United States, Oct. 26, '31.) 29988.

MANUFACTURE OF AMINOBENZOTHIAZOLES. E. I. Du Pont de Nemours and Co., and M. Engelmann. Oct. 28. 30329.

MANUFACTURE OF AMINOBENZOTHIAZOLES. E. I. Du Pont de Nemours and Co., and M. Engelmann. Oct. 29. 30384.

MANUFACTURE OF ORTHO-OXYAZO-DYESTUFFS. W. W. Groves (*I. G. Farbenindustrie*). Oct. 26. 30020.

TREATMENT OF BENZINE OR GASOLINE. Hanseatische Mühlenwerke Akt.-Ges. Oct. 28. (United States, Oct. 28.) 30317.

PIGMENTS. Harshaw Chemical Co. Oct. 26. (United States, May 23.) 29991.

MANUFACTURE OF HIGH MOLECULAR ETHERS. Henkel et Cie Ges. Oct. Oct. 26. (Germany, Dec. 29, '31.) 29998.

MANUFACTURE OF CHROME YELLOW COLOURS. J. Y. Johnson (*I. G. Farbenindustrie.*) Oct. 26. 29994.

MANUFACTURE OF WAX-LIKE SUBSTANCES. J. Y. Johnson (*I. G. Farbenindustrie.*) Oct. 28. 30293.

MANUFACTURE OF ORGANIC COMPOUNDS. J. Y. Johnson (*I. G. Farbenindustrie.*) Oct. 28. 30294.

MANUFACTURE OF RED CHROMATE PIGMENTS. J. Y. Johnson (*I. G. Farbenindustrie.*) Oct. 28. 30295.

CLEANING AGENTS. J. Y. Johnson (*I. G. Farbenindustrie.*) Oct. 28. 30296.

MANUFACTURE OF SOLUTIONS OF FIBROIN. I. G. Farbenindustrie. Oct. 24. (Germany, Oct. 24, '31.) 29693.

MANUFACTURE OF RUBBER CHLORINATION PRODUCTS. I. G. Farbenindustrie. Oct. 26. (Germany, Oct. 27, '31.) 29996.

MANUFACTURE OF INDOLE COMPOUNDS. I. G. Farbenindustrie. Oct. 28. (Germany, Oct. 31, '31.) 30311.

DYESTUFF INTERMEDIATES. Imperial Chemical Industries, Ltd., and W. A. Sexton. Oct. 24. 29728.

DEGREASING OF MATERIALS CONTAINING MOISTURE. Imperial Chemical Industries, Ltd. Oct. 28. 30328.

RECOVERY OF HYDROCARBONS BY MEANS OF SOLID ADSORPTIVE AGENTS. Metallges Akt.-Ges. Oct. 28. (Germany, Dec. 21, '31.) 30322.

# From Week to Week

MR. E. N. DA C. ANDRADE gave the first of a series of lectures on "Rays and Radiation" at the Royal Institution on November 1.

PROFESSOR SIR FREDERICK KEEBLE will be the guest of the evening at the annual chemical dinner at which Professor H. E. Armstrong will preside, on Thursday, December 8, at the Connaught Rooms, Great Queen Street, London, W.C.2.

THE SWEDISH GOVERNMENT has been approached for financial assistance to start production of fertiliser potash from feldspar and leptites by a method which, it is alleged, would yield good financial returns even at one-half of the current selling prices of imported potash.

THE RECENTLY DISCOVERED KAWARAU GOLDFIELD is described by Professor James Park, the Dean of the Mining Faculty at the Otago University, as one of the most promising things seen in alluvial mining in New Zealand, which should open a new era in the history of the Otago goldfields.

THE CUBAN GOVERNMENT has recently appointed a commission to prepare regulations governing the application of the law passed in the early part of 1932, which made cattle tick eradication in Cuba obligatory. A bureau has been created under the Department of Agriculture, Commerce and Labour, which will conduct the campaign for tick eradication.

LORD MACMILLAN has agreed to succeed as president of the National Institute of Industrial Psychology, Lord D'Abernon, who has had to resign the position owing to pressure of other engagements. The executive committee of the Institute has placed on record its appreciation of the services of Lord D'Abernon, who succeeded Lord Balfour in 1930.

AT EXTRAORDINARY GENERAL MEETINGS of the Burbanks Mining and Investment Trust, Ltd., and Houtpoort Proprietary, Ltd., a scheme of amalgamation was approved, after some discussion at the meeting of the first company. The scheme involves the liquidation of the two companies, and the formation of a new company, entitled "Houtpoort-Burbanks Goldfields, Ltd."

TRIBUTE WAS PAID to the foresight and public spirit of South Wales coalowners by Mr. Donald Hicks, M.Sc., who read a paper at the Technical College, Cardiff, on October 28, on "The Physical and Chemical Examination of a Coal Seam," at a joint meeting of the Society of Chemical Industry and the Institute of Chemistry. Research, he said, had only been possible through the active and enthusiastic co-operation of the coalowner in giving the investigators every facility to carry out their programme.

TO MEET THE DEMAND for British machinery, Sulzer Bros. (London), Ltd., have entered into an agreement with Sir W. G. Armstrong Whitworth and Co. (Engineers), Ltd., to manufacture certain of their specialities exclusively for the Sulzer firm at Scotswood Works, Newcastle-upon-Tyne. The production will be under the immediate supervision of inspectors trained at the Winterthur Works. This arrangement, however, does not preclude the supply of machinery manufactured in Switzerland as hitherto, but the fact that the company is now in a position also to supply British built plant will, it is hoped, enable the company to retain the patronage of existing customers in this country, and also add to their number.

AN ADDRESS on "The Effects of Building Materials on Paint Films" was given by Mr. H. M. Llewellyn at a recent meeting of the Licentiate Discussion Club of the Institute of Builders. He said that the Building Research Station had undertaken the investigation of the failure of paint and distemper on cements, plasters and other materials, with the result that the chief causes and types of the failure had been ascertained and remedies suggested. He explained the effects of water and dissolved chemical substances on paint film, giving methods of avoiding defects. He also emphasised the danger of sealing a partition with paint and distemper before allowing the work to dry, and likewise touched upon methods of testing plasters.

THE 18TH "PHYSICS IN INDUSTRY" LECTURE, founded by the Institute of Physics, was delivered by Dr. G. C. Simpson, F.R.S., director of the Meteorological Office, on November 2. For his subject Dr. Simpson took "Physics in Meteorology," and made reference to the fact that spectroscopy has recently been used by Dr. Dobson, of Oxford, to investigate the amount of ozone present in the upper atmosphere. He finds that, while there is practically no ozone lower than 30 miles above the surface, at greater heights there is a relatively large quantity and it is the presence of this ozone which makes the upper atmosphere warm. A very unexpected result has come out of this work, for Dr. Dobson shows that the ozone is not uniformly distributed, but is concentrated in the neighbourhood of cyclonic depressions, and is relatively weak in the neighbourhood of anticyclones. How cyclones and anticyclones, which are known to be phenomena of the lower atmosphere, can affect the amount of ozone 30 miles up in the atmosphere, or whether it is the other way about and the ozone causes the cyclones, are problems which cannot yet be solved.

MR. H. GWYNNE TREW has resigned his directorship of the Spies Petroleum Co., Ltd., finding himself not in harmony with the board.

MR. A. BURGESS, general sales manager, has been elected an additional director of Worthington-Simpson, Ltd. Mr. Burgess has previously represented the Worthington interests in Brussels, Paris, Buenos Aires, etc.

DR. M. NIERENSTEIN, lecturing last week in the chemistry lecture theatre, Bristol University, on "England's Early Quest for Bullion," the first of a series of six public lectures, entitled "The Origins of English Chemistry," said that, roughly, 600,000 substances had been listed. The lecture was illustrated with lantern slides.

FERTILISER MATERIALS EXPORTED FROM ARGENTINA during the first seven months of 1932 included 15,464 metric tons of bones, 7,995 tons of ground bones, 6,370 tons of dried blood, and 18,718 tons of miscellaneous products, exclusive of 680 tons of shanks, according to an unofficial compilation. Thirty-three Buenos Aires firms are listed as shippers.

MR. WILLIAM MORGAN, analytical chemist of the Tredegar Iron and Coal Co. for 50 years, has retired. Last week, to commemorate his long service, Mr. Morgan was presented with a wallet of notes and a radio set on behalf of the directorate and company officials. The presentations were made by Mr. W. D. Wolley, J.P., managing director.

MR. ROBERT INNES CAMERON, of Southview, Elgin, and High Street, Elgin, distiller, proprietor of the Tenninich Distillery Co., managing director of the Linkwood-Glenlivet Distillery Co., of Elgin, and a director of James Catto and Co., Ltd., of Aberdeen, who died on June 11, left personal estate in Great Britain to the value of £460,632.

THE COUNCIL of the Institution of Mining Engineers has accepted an offer of £300 made by Mavor Coulson Ltd., of Glasgow, to extend their travelling studentship for another year. The studentship is open to British subjects between the ages of 22 and 30, and Canada or the United States must be included in the itinerary. Applications are to be made before December 31 to the Secretary, Cleveland House, 225 City Road, London, E.C.1.

THE IMPORT DUTIES ADVISORY COMMITTEE, which has been requested by the Chancellor of the Exchequer to inquire into and report upon the silk and artificial silk duties, is prepared to receive representations from interests concerned. Representations should be submitted as fully as possible in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, London, S.W.1, not later than November 25. Communications should, so far as possible, be made by associations or other bodies representative of interests affected.

SPECIAL TRAVELLING CONCESSIONS to their buyers attending the British Industries Fair in London and Birmingham next February are announced by 16 European countries. The railway fares, which are linked up over British railway companies operating from Continental ports, will be reduced by one-fourth. Further concessions will be announced shortly. British railways have agreed to reductions to visitors from the United Kingdom to official trade fairs in Europe and British buyers will be given reciprocal facilities in those countries which have made concessions to buyers visiting our Fair. The air services are also making reductions.

REVISED REGULATIONS relating to the industrial use of methylated spirits have been issued as Statutory Rules and Orders, No. 843, dated October 4. (H.M. Stationery Office, price 2d.) This order contains new schedules to be substituted for schedules in the principal regulations, S.R. & O., No. 832, of 1930. Any person authorised by the Commissioners of Customs and Excise to receive industrial methylated spirits and to use such industrial methylated spirits in making articles referred to in the second schedule to the principal regulations shall without further authority from the Commissioners be now entitled to receive industrial methylated spirits and to use such industrial methylated spirits in making articles referred to in the revised schedule.

IN THE CHANCERY DIVISION on October 28, Mr. Justice Farwell had before him a motion in the action of Edwards Harlene, Ltd., against John Thompson (Wholesale Druggists, 1921) Ltd., for an injunction against the defendants. Mr. Trevor Watson, K.C., for the plaintiffs, said a woman named Hedge, who apparently had "Arline" as one of her Christian names, used the word to put on the market a preparation called "Arline Camomile Gold Wash." The defendants were a reputable Liverpool firm of distributors, and by mistake included this preparation in their catalogue as "Arlene." They were now willing to give an undertaking that they would not sell or offer for sale or advertise any preparations for the hair not of plaintiffs' manufacture as "Arlene Hair Wash," or in connection with the name "Arlene." Counsel for the defendants consented, and his lordship said there would be perpetual injunction with costs, the motion, by consent, being treated as the trial of the action.

# Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

## Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

BREDT (W.), LTD., London, E.C., manufacturing chemists. (M. 5/11/32.) Registered October 19, £1,000 debentures; general charge. *Nil. September 7, 1931.

MALEHURST BARYTES CO., LTD. (M. 5/11/32.) Registered October 19, £3,500 further charge endorsed on debentures of July 12, 1932, to B. Laporte, Ltd., Kingsway, Luton; charged on property comprised in the debenture. *£107,235. March 1, 1932.

### Satisfactions

ACID PRODUCTS, LTD., Bradford. (M.S., 5/11/32.) Satisfaction registered October 25, of mortgage registered October 30, 1923.

AFRICAN MANGANESE CO., LTD., London, E.C. (M.S., 5/11/32.) Satisfaction registered October 21, of debenture stock registered April 13, 1923, to extent of £36,000.

APEX (BRITISH) ARTIFICIAL SILK, LTD., London, E. (M.S., 5/11/32.) Satisfaction registered October 20, of debenture registered May 5, 1930.

## County Court Judgment

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

WARD, HORACE WM. DUDLEY, 8 Russell Avenue, Bedford, chemical works manager. (C.C. 5/11/32.) £31 6s. 4d. September 26.

## London Gazette, &c.

### Winding Up Petition

RAYON MANUFACTURING CO. (1927), LTD. (W.U.P. 5/11/32.) A petition for the winding-up of this company by the High Court of Justice was, on October 24 presented by the London & Home Counties Joint Electricity Authority, 5 Millbank, Westminster, London and is to be heard at the Royal Courts of Justice, Strand, London, on November 7.

BOLGAR OIL PROCESSES, LTD. (W.U.P. 5/11/32.) A petition for the winding-up of this company by the High Court of Justice was, on October 21, presented by Laszlo Bolgar, V.16, Csaky Utca, Budapest, Hungary, and is to be heard at the Royal Courts of Justice, Strand, London, on November 7.

### Company Winding Up

THE CHEMICAL NEWS, LTD., Merton House, Salisbury Square, London, E.C.4. (C.W.U. 5/11/32.) Winging-up order, October 24.

### Bankruptcy Information

WOOD, CYRIL CLAUDE, "Sharuhen," Honiton Road, Exeter, and lately carrying on business at Preston Street, Exeter, acid manufacturer. (R.O. 5/11/32.) Receiving Order October 29, debtor's petition.

# Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

**Egypt.**—The Commercial Secretary to the Residency, Egypt, has forwarded a specification relative to a call for tenders by the Ministry of Public Works, Mechanical and Electrical Department, for the supply, erection and delivery to the Ministry in perfect working order and condition of a complete installation of one distilling plant at Koseer. The plant to be supplied and erected includes:—(a) evaporators complete with separators, (b) preheaters, (c) condenser, (d) steam pumping sets complete with accessories, (e) steam boilers, (f) piping and piping connections and (g) lifting tackle. Tenders will be received up till noon, December 3, 1932. They should be addressed to: The Director-General, Mechanical and Electrical Department, Ministry of Public Works, Cairo, Egypt. (Ref. G. 11970.)

# Company News

**British Oxygen Co.**—An interim dividend of 2 per cent. has been declared, payable on November 10.

**Socony-Vacuum Co.**—The quarterly dividend has been reduced from 20 to 10 cents.

**Standard Oil Co. of New Jersey.**—The regular quarterly dividend of 25 cents and an extra payment of 25 cents has been declared.

**N. V. Van den Bergh's Fabrieken.**—An interim dividend has been declared on the 15 per cent. preferred ordinary shares.

**British Match Corporation, Ltd.**—An interim dividend has been declared on the ordinary shares of 2 per cent., tax free, payable on November 15.

**Rio Tinto Co., Ltd.**—It is announced that the half-year's dividend of 2s. 6d. per share will be paid as usual on the preference shares, less tax, on November 15.

**North Broken Hill.**—A profit of £175,752 is reported for the year to June 30, and £478,940 was brought in. Dividends paid absorbed £175,000, appropriation for plant expenditure £77,745, leaving £401,946 to be carried forward.

**Antigua Sugar Factory.**—The profit and loss account for the year ended September 30 last shows a surplus of £11,780. The directors recommend a dividend of 5 per cent., subject to tax, leaving a balance of £23,060 to be carried forward.

**Glenboig Union Fireclay.**—The balance at the credit of profit and loss account for the year to August 31 last, after transferring £7,500 from reserve, amounts to £412, which the directors recommend be carried forward.

**North British Rayon, Ltd.**—A trading profit of £17,803, and a net profit, after charging £10,000 for depreciation, of £2,824, is shown in the report for the year to June 30 last. In the previous year, there was a total loss of £19,398, written off under the capital reduction scheme.

# Forthcoming Events

**Nov. 7.**—Society of Chemical Industry (London Section). "Fermentation of Cellulose." H.M. Langwell. "Examination of Asphalt Mixtures for Road Pavements." Norman H. Taylor. 8 p.m. Burlington House, London.

**Nov. 8.**—Institution of Petroleum Technologists. "The Mechanism of Lubrication." W. F. Parish and L. Cammen, read by Dr. F. H. Garner. 5.30 p.m. John Street, Adelphi, London.

**Nov. 8.**—Institute of Chemistry (Huddersfield Section). "The Hydrogenation Process." K. Gordon.

**Nov. 9.**—Alchemists' Club. Presidential Address by D. McCreath. 7.30 p.m. University, Glasgow.

**Nov. 9.**—Institute of Fuel. "Refuse Disposal." Dr. E. W. Smith. 6 p.m. Burlington House, London.

**Nov. 9.**—Society of Dyers and Colourists (Midlands Section). "New Methods in the Finishing of Textile Materials." Dr. Kertess. Nottingham.

**Nov. 10.**—Society of Chemical Industry (Nottingham Section). "The Science of Stockings." Dr. R. H. Pickard. 7.30 p.m. University College, Shakespeare Street, Nottingham.

**Nov. 10.**—Institute of Metals (Swansea Section). "Some Stainless Alloys." L. B. Pfeil. 6.15 p.m. Y.M.C.A. Swansea.

**Nov. 10.**—Society of Chemical Industry (Bristol Section). "A Contribution to the Relationship of Structure to the Developing Properties of Compounds of the Naphthalene Series." Dr. R. B. Forster and T. H. Hanson.

**Nov. 10.**—Oil and Colour Chemists' Association. "The Use of Pigment Finishes on Light Leathers." W. D. Brown. 7.30 p.m. 30 Russell Square, London.

**Nov. 10.**—Institute of Metals (London Section). "Non-Ferrous Metals and Alloys in Railway Engineering." Sir Henry Fowler. 7.30 p.m. 83 Pall Mall, London.

**Nov. 10.**—Institute of Chemistry (Manchester Section). Annual Conjoint Meeting. "Science and the Community." Professor A. Findlay. Textile Institute, St. Mary's Parsonage, Manchester. 7 p.m.

**Nov. 10.**—Society of Chemical Industry (Birmingham and Midland Section). "Experimental Methods for the Study of Corrosion." J. C. Hudson. 7.30 p.m. University Buildings, Edmund Street, Birmingham.

**Nov. 11.**—Society of Chemical Industry (South Wales Section). "The Chemical Basis of Narcosis." Dr. J. H. Quastell. 7 p.m. Thomas' Café, High Street, Swansea.

**Nov. 11.**—Institute of Chemistry (Scottish Section). Discussion on professional matters. 7.30 p.m. Caldoro Restaurant, Glasgow.

**Nov. 11.**—Oil and Colour Chemists' Association (Manchester Section). Members' evening. Manchester.

**Nov. 11.**—West Cumberland Society of Chemists and Engineers. "Some considerations in the Design of modern High capacity Water Tube Boilers." J. O. Twinberrow. 7 p.m. Workington.

**Nov. 11.**—Institute of Metals (Sheffield Section). "Rolling-Mill Practice and Cluster Mills." E. Williams. 7.30 p.m. University, Sheffield.

**Nov. 11.**—Society of Dyers and Colourists (London Section). "Dry Cleaning Solvents." W. Brown. London.

ADVERTISERS please note that the latest hour at which we can accept advertisements for insertion in these columns each week is 10 o'clock on Thursday morning.

## PUBLIC APPOINTMENTS, ETC.

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APPLICATIONS are invited from qualified candidates for the appointment of a salesman for London area. Candidates should be chemists/engineers experienced in the treatment of industrial waters. Applications should state full particulars and be accompanied by a photograph. Box No. 1442, THE CHEMICAL AGE, Bouverie House, 154 Fleet Street, London, E.C.4.

BRITISH CELLULOSE LACQUERS, LIMITED, STRATFORD, E.15, have a vacancy for a chemist and a laboratory assistant. Application by letter to the Technical Director, stating qualifications, experience, salary expected. Progressive positions. Experience of Lacquer manufacture essential, experience of oil synthetic and water finishes desirable.

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